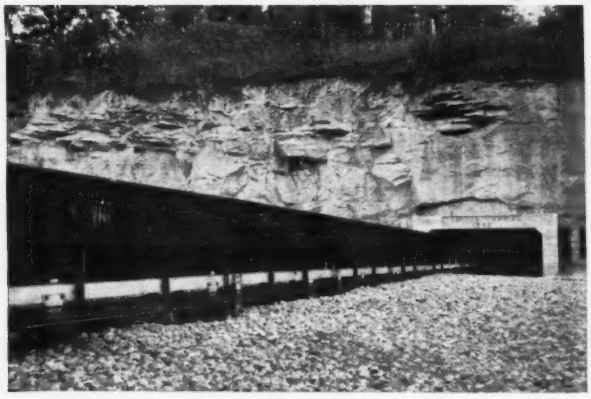
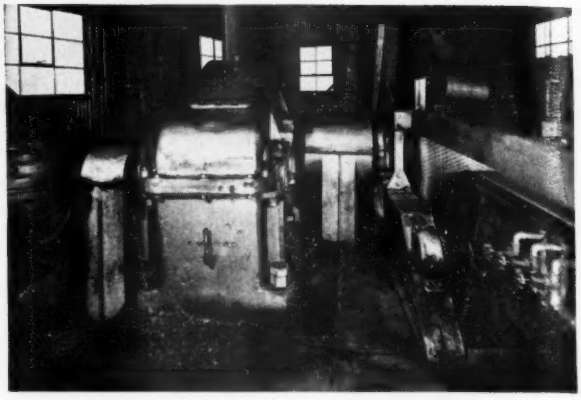
Mining CONGRESS JOURNAL

AMC

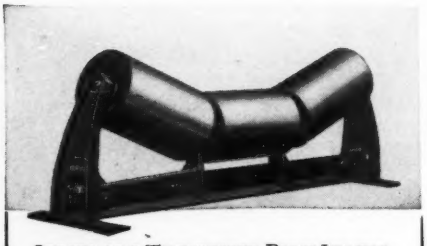
LINK-BELT engineering experience...



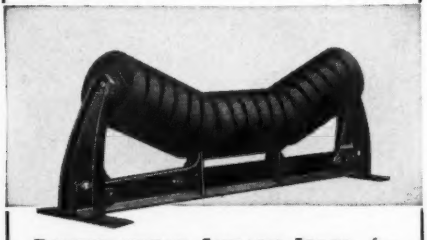


World's longest single belt conveyor, 10,900 feet from foot to head pulley, 30 inches wide, transports coal from preparation plant to river and rail loading station. *Left*, foot end at entrance to tunnel; *right*, head end, showing 200 H.P. herringbone gear drive and welded steel pulleys. Engineered, built and installed by Link-Belt.

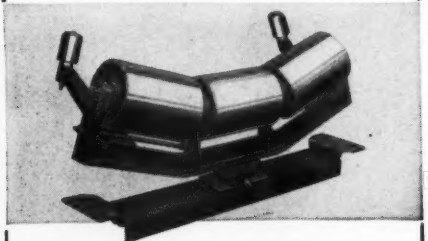
Plus LINK-BELT quality components...



SERIES 100 TROUGHED BELT IDLERS. Strong, balanced integral rolls revolve on high-grade roller bearings, Grease-in, dirt-out seal, large reservoir preserve lubricant.



RUBBER-TREAD IMPACT IDLER for loading points protects the belt by absorbing the shock of heavy materials or lumps delivered from above.



BELT-TRAINING IDLER for automatic belt positioning. The actuating rolls respond to slightest contact — quickly recede and center the belt to minimize wear.

...add up to your best bet in

BELT CONVEYORS

WHAT'S your materials handling problem? Tonnage, distance or a combination of the two? Heavy or light materials? Large lumps or fines? Continuous or intermittent operation?

Whatever the conditions, you'll find the right answers at Link-Belt. For Link-Belt designs conveyor systems to meet your requirements. Backed by unmatched materials handling and power transmission experience, our conveyor specialists help you and your consultants get the right equipment in the right place.

One Source—One Responsibility

Link-Belt makes all the various elements — all types and sizes of idlers, takeups, pulleys, trippers, bearings and power transmission drives. Plus all related equipment — other types of conveyors, feeders, elevators, car dumpers and shakers.

And Link-Belt will build your supporting structures and enclosures . . . install the job completely. One source — one responsibility. Every detail receives the proper attention to assure you an efficient, trouble-free, long-life conveying system.

The next time you need belt conveyor engineering assistance, call the Link-Belt specialist in our office near you.

LINK-BELT

BELT CONVEYOR EQUIPMENT

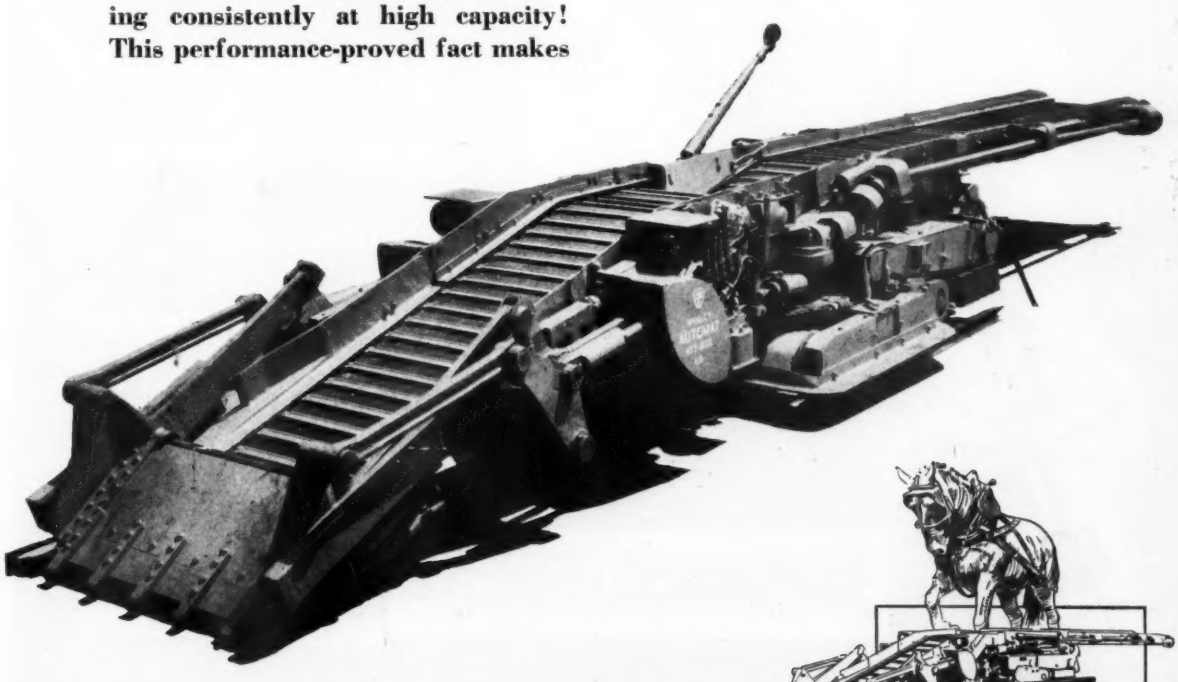
LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington 9, W. Va., Louisville 2, Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis 1, Seattle 4, Toronto 8, Springs (South Africa). 12.300-C

The Ease of Operation of the Whaley "Automat" Is Important to the Economical Operation of Your Mine!

Ask any coal mine superintendent with mechanical loading experience and he will tell you why the Whaley "Automat" can take the punching of coal or rock loading so consistently. He will tell you why it runs smoother, has fewer breakdowns which naturally results in less down time and minimum maintenance.

The "Automat" has no equal when it comes to standing up under the wear and tear of rock work and loading consistently at high capacity! This performance-proved fact makes the easier task of coal loading comparatively easy for the "Automat". Its exclusive shovel type loading head penetrates the coal or other material at the logical point—the bottom—and loads with the greatest possible ease! For coal or rock loading you need the dependable, economical performance of the powerful Whaley "Automat". For complete information, write us today! Myers-Whaley Company, Knoxville 9, Tennessee.



MYERS-WHALEY

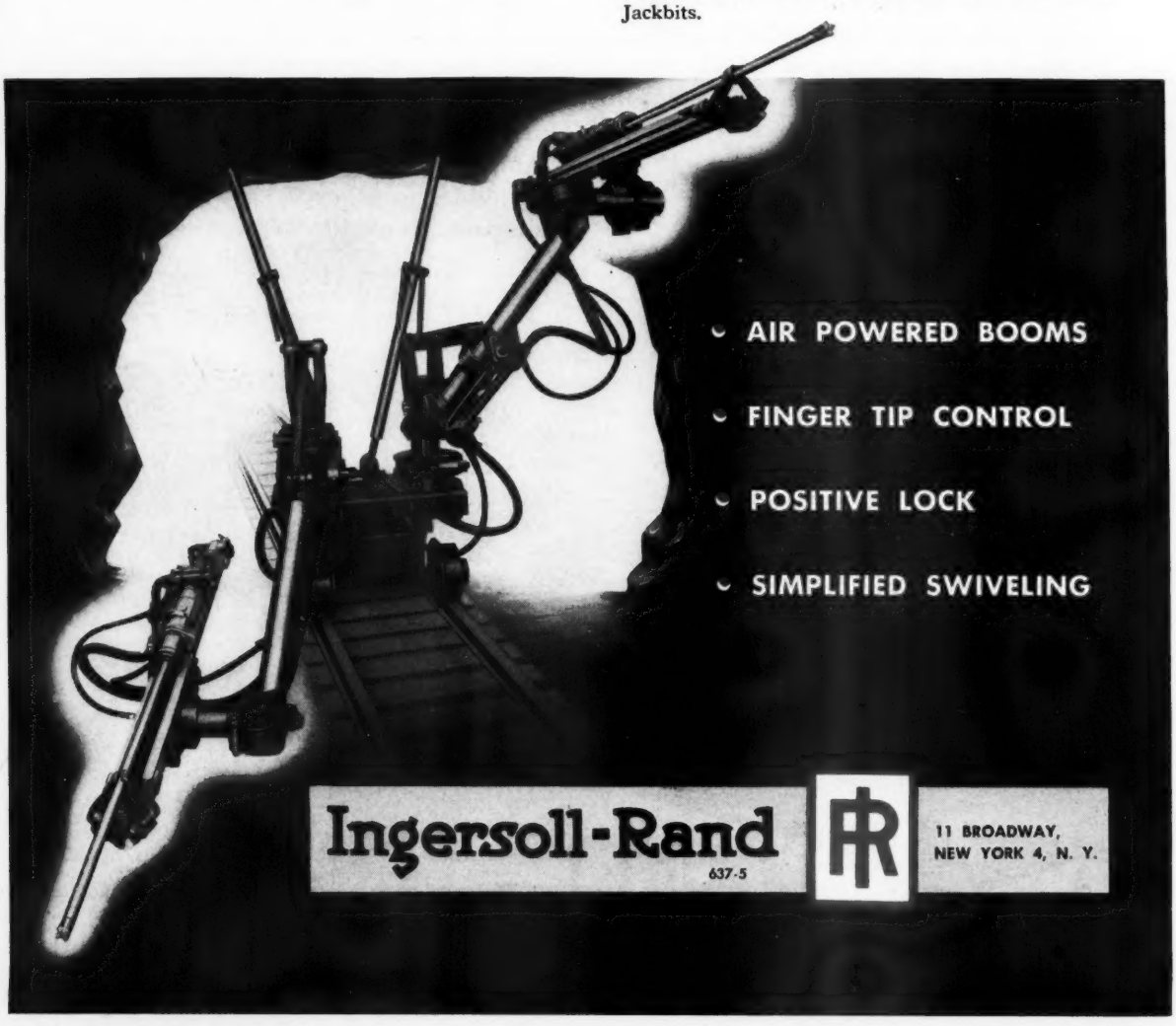
"MECHANICAL LOADERS EXCLUSIVELY FOR OVER 40 YEARS"

Here's Why You Can Drill Out a Round 33% FASTER with the new DJB-2 boom jumbo

● Field reports *prove* that this air-operated boom jumbo will drill out a round in one-third less time than with conventional column and arm methods. That's because *set-up time* is converted into *drilling time*. There's no need to wrestle with heavy arms and machines every time you start a new hole.

An I-R air motor raises or lowers the drill to any desired position at the touch of a finger. It operates the boom through a rugged, self-locking screw drive which prevents creeping or settling, and holds the boom firmly in place even after the air is shut off. This simple, dependable mechanism will withstand abuse and is not easily affected by acid mine water or muck.

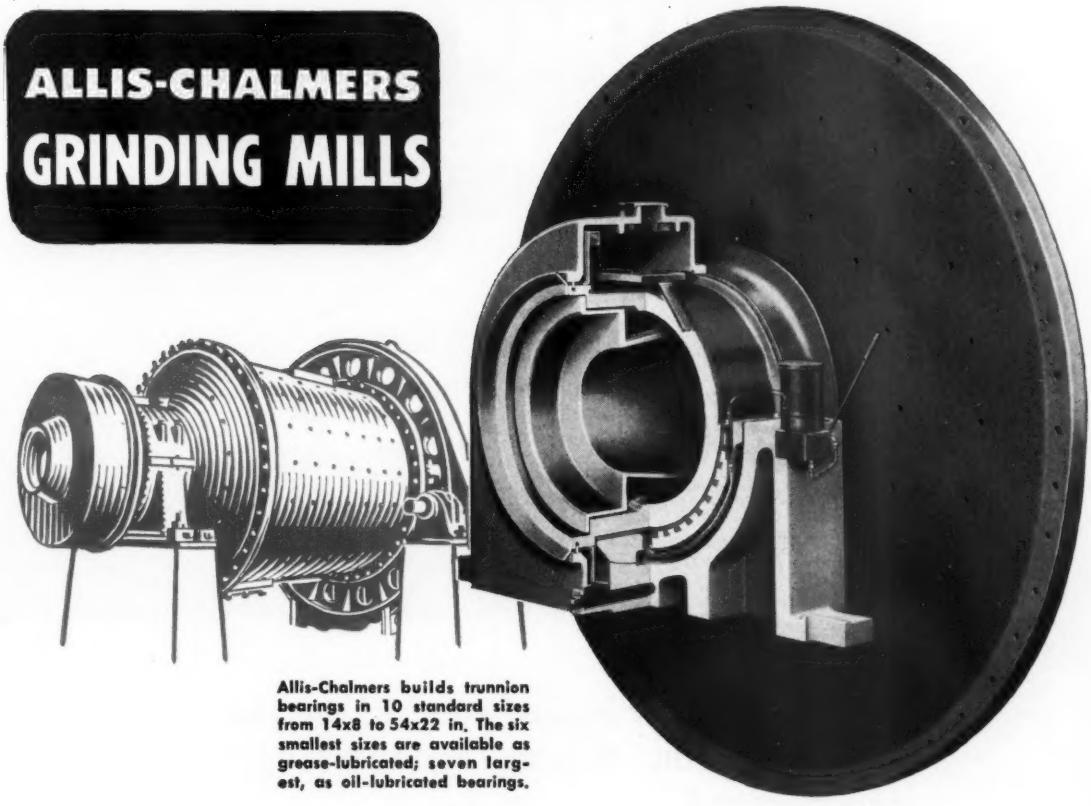
The DJM-2 Boom Jumbo is available as a compact, car-mounted unit—complete with built-in air and water piping, self-contained lubricator, and universal, 16-ton ceiling jacks for fast, easy anchoring in any underground location. If desired, the booms can be furnished separately, for installation on single or multiple unit rigs. Ask for full information on the I-R drilling combination, consisting of the Boom Jumbo, DB-35 drifters, aluminum shells and carset Jackbits.



ROCK DRILLS • COMPRESSORS • AIR TOOLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL & GAS ENGINES

Trunnion Bearing Engineered to End Alignment Troubles

ALLIS-CHALMERS
GRINDING MILLS



Allis-Chalmers builds trunnion bearings in 10 standard sizes from 14x8 to 54x22 in. The six smallest sizes are available as grease-lubricated; seven largest, as oil-lubricated bearings.

BALL AND SOCKET design of this Allis-Chalmers trunnion bearing provides a spherical seat that corrects for *any* minor misalignment of mill and bearing. Load is always distributed evenly across the full face of the bearing.

A complete, self-enclosed oiling system is contained in the bearing housing. Soft babbitt cannot score polished trunnion surface.

Large oil-lubricated trunnion bearings are provided with a hand-operated lubricant pump for floating the mill prior to starting. This eliminates high starting torque, an important feature, since 75 percent of bearing wear occurs during initial starting after shut-down. Motor inrush current is decreased.

Allis-Chalmers builds trunnion bearings in lengths approximately one-half the diameter, in agreement with the latest engineering trend. Ample bearing area keeps bearing pressure low, prolongs bearing life.

The Allis-Chalmers representative in your area can give you more facts about bearings and other features of Allis-Chalmers grinding mills. Allis-Chalmers, Milwaukee 1, Wisconsin. A-3479

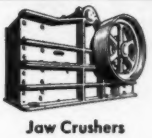
Pulverator is an Allis-Chalmers trademark.

ALLIS-CHALMERS

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Pulverators

Vibrating Screens



Jaw Crushers

Motors

Gyratory Crushers

Kilns, Coolers, Dryers

AMERICAN MINING CONGRESS

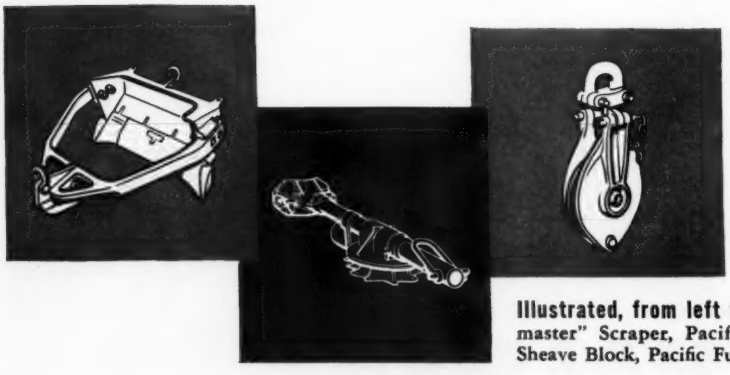
HOME TOWN OF

Pacific

PRODUCTS

Welcome to Los Angeles...

YOU are cordially invited to visit our plant and see Pacific Mining Products being manufactured.



Pacific Mining Products

"Slushmaster" Scrapers, "Round-The-Corner" Sheave Blocks, Sheave Blocks, Bit Knockers, Jaw Crushers, Manganese Steel Crusher Jaws, Manganese Steel Tractor Sprockets, Manganese Steel Tractor Idler Rims, Rock Bit Grinders, Crawler Shoes for Power Shovels, Other Pacific Wearing Parts.

Illustrated, from left to right: Pacific "Slushmaster" Scraper, Pacific "Round-The-Corner" Sheave Block, Pacific Full Shroud Sheave Block.

ALLOY STEEL & METALS CO.

1862 EAST 55TH STREET, LOS ANGELES 58, CALIFORNIA

Mailing Address: Box 15323 Vernon Sta., Los Angeles 58, Calif.

Editorial Director
JULIAN D. CONOVER
Editor
JOHN C. FOX
Assistant to Editor
GEORGE W. SALL
Associate Editors
A. W. DICKINSON
G. B. SOUTHWARD
H. L. MOFFETT

Mining CONGRESS JOURNAL

Production
B. C. WILKERSON
J. J. WARD

Advertising
P. D. MCMURRER, Mgr.
FRANK W. MORAN
Chicago
RALPH F. DUYSTERS
New York City
RALPH W. HARKER
Los Angeles and San Francisco

Contents

VOLUME 37, NUMBER 10 FOR OCTOBER, 1951

FRONT COVER: Mechanical mucking aided shaft sinking in the Mayflower Shaft of the New Park Mining Co., Park City District, Utah.

EDITORIALS 31
So You Need Steel
Get Your Money's Worth

PROCESSING ALUMINUM ORE 32
By EVANS W. BUSKETT

GAS TURBINE LOCOMOTIVE 35

1951 WESTERN CONVENTION IN LOS ANGELES 38
Official Program 46-47-50

HANNA'S MAINTENANCE PROGRAM 52
By D. S. KLECKNER

THE COEUR D'ALENE—A MINING EMPIRE 56
By H. W. INGALLS

TREATED TIES IN MINE HAULAGEROADS 59
By R. W. WATSON AND A. E. BELTON

GEOCHEMISTRY—A SYMPOSIUM ON THE PROSPECTOR'S NEWEST TOOL .. 62
By OLIVER KINGMAN AND GEORGE M. FOWLER

WITH THE DEFENSE AGENCIES 68
By HARRY L. MOFFETT

WHEELS OF GOVERNMENT 76

PERSONALS 85

NEWS & VIEWS 93

MANUFACTURERS FORUM 118

Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

Indexed regularly by Engineering Index, Inc.

Copyright 1951, by

THE AMERICAN MINING CONGRESS
1102 RING BLDG., WASHINGTON 6, D. C.

HOWARD I. YOUNG, *President* — DONALD A. CALLAHAN, *Vice President* — ANDREW FLETCHER, *Vice President* — WILLIAM J. JENKINS, *Vice President* — JULIAN D. CONOVER, *Secretary*

Published Monthly. Yearly subscriptions, United States, Canada, Central and South America, $3.00. Foreign, $5.00. Single copies, $0.30. February Annual Review Issue, $1.00. Entered as Second-class Matter. January 30, 1915, at the Post Office at Washington, D. C.

Member Audit Bureau of Circulation.

MACK TRUCKS

See You Through

• There are many good reasons why a Mack is your best truck investment during times like the present. Most important of all is the undisputed fact that Mack trucks outlast them all.

This means that with a Mack truck you can face the uncertainties of the future with assurance...confident that even if trucks should become hard to replace your Mack will see you through...that it will stay on the job delivering dependable service mile after mile and year after year.

Thousands of truck users in World War II found out by actual experience that they were indeed "Lucky to own a Mack." Whatever the future may bring, you'll find that for a sound investment in long-term reliability and operating economy there's no other truck to match a Mack.

Your nearest Mack branch or distributor will give you the full story on what "Built Like A Mack" means in *extra* long life, *extra* strength and stamina, *extra* performance and *extra* dependability.

Mack TRUCKS

...outlast them all

Mack Trucks, Empire State Building, New York 1, N.Y. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

In rigorous coal stripping service, big Mack Model LRSW six-wheel trucks have won an outstanding reputation for "seeing things through" with long-lasting, dependable operation.

Taking coal for a ride . . . easier

WITH more than 300 cars handling coal at this midwest mine, lubrication of the wheel bearings could have become a real headache. That's why mine operators switched to SUPERLA Mine Lubricant No. 4 as suggested by a Standard Oil lubrication specialist over four years ago.

Already used in main transmissions and gathering heads of the mine's Joy loaders, SUPERLA Mine Lubricant No. 4 proved superior to other greases for wheel bearing lubrication as well. Leakage from the bearing housings was eliminated and consumption reduced. Motor men reported lower power requirements. Oilers found SUPERLA Mine Lubricant easy to withdraw from the barrel, easy to dispense with hand-operated guns. The versatility of SUPERLA Mine Lubricant No. 4 has both simplified the problem of inventory and reduced overall lubrication costs.

SUPERLA
REG. U. S. PAT. OFF.
Mine Lubricant No. 4

SUPERLA Mine Lubricant No. 4 has solved more than one problem in this mine. Chances are that it (or another SUPERLA Mine Lubricant) can do a similar job for you. There is a Standard Oil lubrication specialist located near your mine. For his help, call your local Standard Oil office today. Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Illinois.

What's your problem?

J. A. Grieve, lubrication specialist at Standard Oil's Decatur office, helped this midwest mine use SUPERLA Mine Lubricant No. 4 to good advantage. He was close at hand, gave operators engineering service when they needed it.

There's a corps of Standard Oil lubrication specialists throughout the Midwest. You'll find one located near your mine. Through special training and a lot of practical experience, this man has gained a working knowledge of lubrication that can mean real savings for you. To obtain his services, simply contact the nearest Standard Oil office. Discuss with him the savings you can make with such outstanding products as:

STANOIL Industrial Oils—Here's *one* line of oils that provides cleaner operation of loader and crane hydraulic units; supplies effective lubrication in compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

CALUMET Viscous Lubricants—On open gears and wire ropes, these greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of gears and better internal lubrication of wire rope.

STANDARD OIL COMPANY STANDARD *(Indiana)*

Welcome to Los Angeles

GODDARD-JACKSON COMPANY

935-37 Santa Fe Avenue **TRinity 6282** **Los Angeles 21, Calif.**

GO-JAX

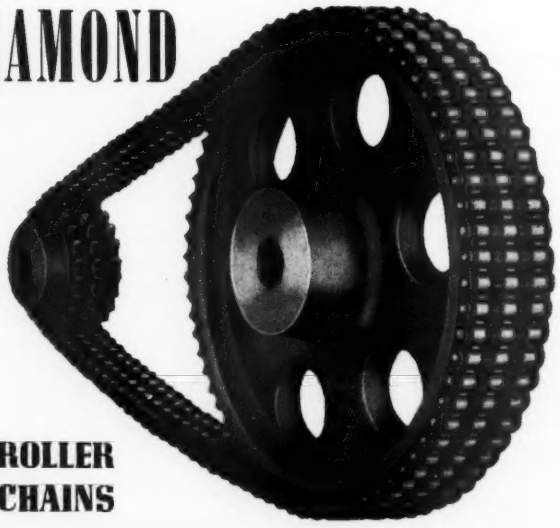
DIAMOND ROLLER CHAIN AND SPROCKETS
DIAMOND FLEXIBLE COUPLINGS
COUPLINGS
AMERICAN V-BELTS AND SHEAVES
SPLIT STEEL PULLEYS
CONVEYOR PULLEYS
MOTOR PULLEYS
SET COLLARS
SPEED REDUCERS
HANGERS
CHICAGO LEATHER BELTING
BELT DRESSING AND CEMENT
LEATHER PACKINGS
CONVEYOR BELTING
REEVES VARI-SPEED UNITS
BONDTRU FLEXIBLE COUPLINGS
FAFNIR BEARINGS
PILLOW BLOCKS
MALLEABLE CHAIN AND SPROCKETS
MOTORS
RUBBER BELTING
HOSE
PACKINGS
KINNEY CLUTCHES
ALLIGATOR, CLIPPER, FLEXCO LEATHER BELT LACINGS
SCREW CONVEYORS
TROUGHING AND RETURN ROLLS

STOCKING DISTRIBUTORS FOR

DIAMOND CHAIN COMPANY, INC.
THE AMERICAN PULLEY COMPANY
CHICAGO BELTING COMPANY
THE FAFNIR BEARING COMPANY
CHARLES BOND COMPANY
BOND FOUNDRY AND MACHINE COMPANY
WINFIELD H. SMITH CORP.
PEORIA MALLEABLE IRON COMPANY
TOLEDO TIMER COMPANY
KINNEY MANUFACTURING COMPANY
DIAMOND RUBBER COMPANY
REEVES PULLEY COMPANY
FLEXIBLE STEEL LACING COMPANY
THERMOID RUBBER CO.

DIAMOND

QUALITY

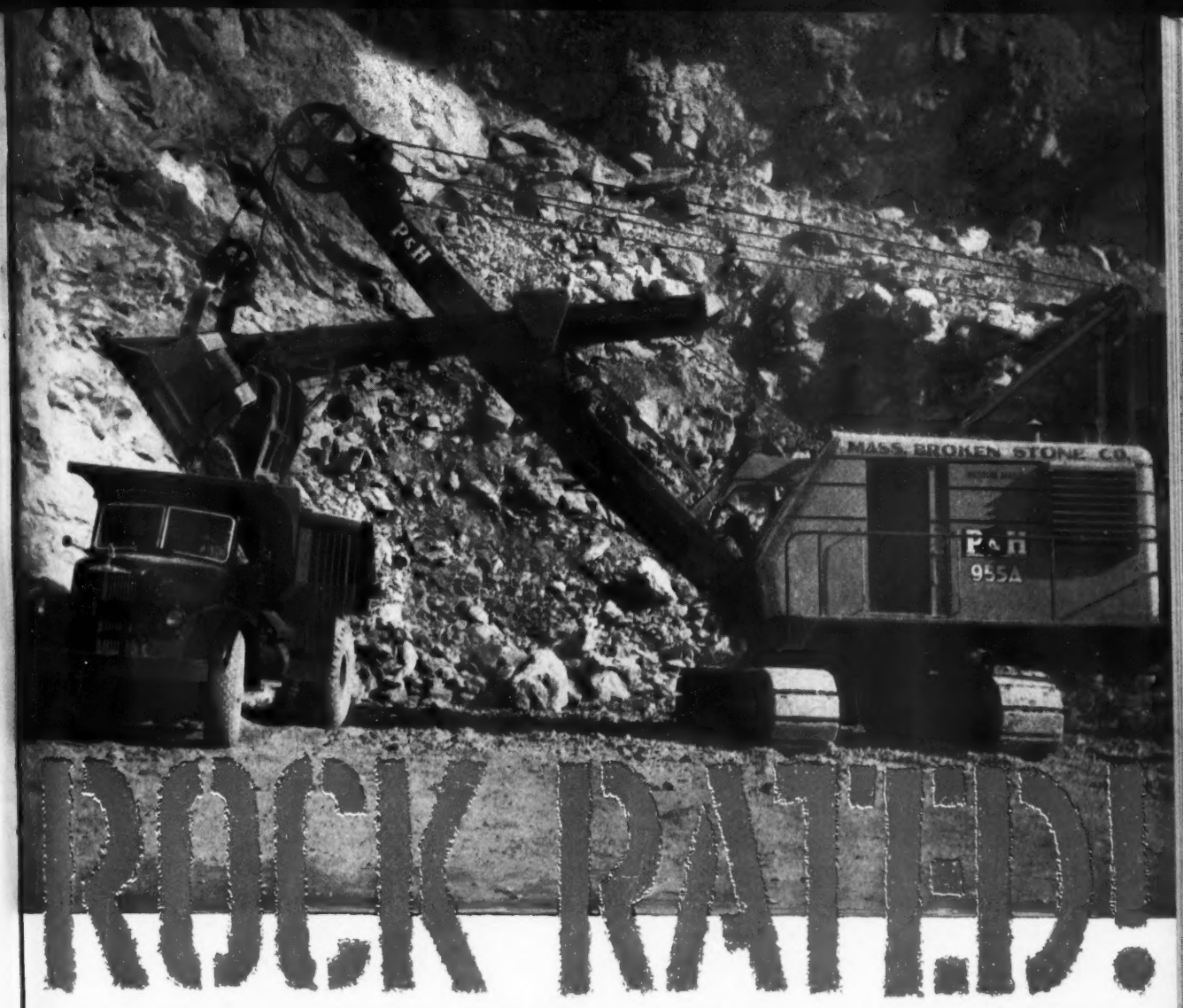


SERVICE

ROLLER CHAINS

If you have a drive problem—our engineering department is at your disposal

Office Hours: 8:00 a.m.-5:00 p.m.
Saturdays . . . 8:00 a.m-1:00 p.m.



ROCK RATED!

TO GIVE YOU MORE YEARS OF PROFIT

P&H MAGNETORQUE* ELECTRIC SWING

SAVES YOU TIME, TROUBLE, MONEY!

Bring on your heaviest going! The 955-A is ready for it! It's the 2½ yd. companion of the famous P&H 1055 — with all its proved engineering — tough all-welded construction — greater stability — live roller circle — adjustable hook rollers — and many other advancements that assure years of hard service with minimum cost.

Operating advantages? More than you've ever known in a machine of its size. Magnetorque Swing does away with the old swing frictions — with all their headaches — forever. It's faster — 15% to 25% faster.

Ask us where you can see one in operation. Learn what "ROCK RATED" really means.

*T. M. of Harnischfeger Corporation for electro-magnetic type clutch.

P&H **EXCAVATORS**
4555 West National Avenue
Milwaukee 14, Wisconsin
HARNISCHFEGER CORPORATION

CRUCIBLE STEEL COMPANY OF AMERICA

EXECUTIVE DEPARTMENT
HENRY W. OLIVER BUILDING
P. O. BOX 88. PITTSBURGH 30, PA.
Cable Address "CRAMERICA"

October 22, 1951.

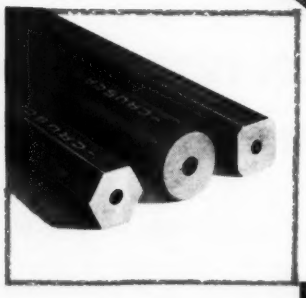
To our friends in the Mining Industry:

The 51st American Mining Congress Convention is another milestone in mining progress. From meetings such as this come the new developments, procedures, and products that will set the pace for our ever-expanding Industry.

Crucible has grown with the Mining Industry. Our 51 years of progress have been, and will continue to be closely linked with the Mining Congress. We salute your efforts to improve the techniques in an Industry that is so vital to our Country in these critical times.

W. H. Wiewel

W. H. WIEWEL
Vice President - Sales



CRUCIBLE first name in special purpose steels

51 years of Fine steelmaking

HOLLOW DRILL STEEL

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.
REX HIGH SPEED • TOOL • STAINLESS • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

Save time on Pesky Jobs

with the 18-pound Le Roi-CLEVELAND Hornet Rock Drill

...and your miners can put more work on production

The H-22 Hornet is a terrific little rock drill. It weighs only 18 lbs., but it has all the design features found in larger Le Roi-CLEVELAND machines. That is why, pound for pound, you can't beat it for drilling speed.

And here's what your miners can do with it—easily and quickly, without strain: Drill holes for trolley hanger bolts. Clean up roof. Clear out rock falls. Brush bottom. Drill oversize pieces at the grizzly. Cut hitches. And a thousand and one other odd jobs.

Because the H-22 Hornet is so light, and drills so fast for its weight, your miners get these tasks done in a hurry — more time can be spent on production; your costs look better. So equip your miners with Le-Roi CLEVELAND Hornets. Complete information is available — just write for it.

H-22 HORNET FEATURES

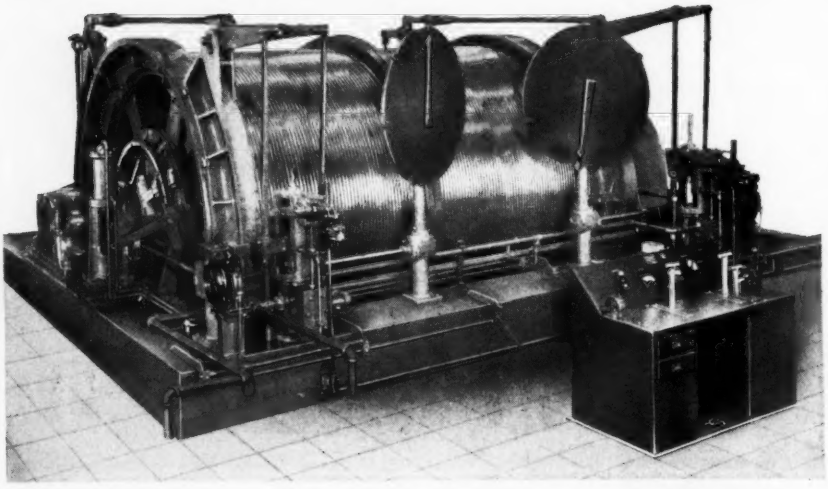
- Weight — 18 lbs.
- Powerful blowing
- Strong rotation — easy holding
- Both wet and dry types
- Conventional rifle-bar rotation (3 pawls)
- Replaceable spacer bushing
- Spade or Tee handle
- 2-piece chuck and rotating sleeve
- Lubrication pocket in handle
- Chuck size 7/8" hex x 3 1/4" — adapters too
- Drop forgings for major parts

LE ROI

LE ROI COMPANY

RD-34

CLEVELAND ROCK DRILL DIVISION
12500 Berea Road, Cleveland 11, Ohio
Plants: Milwaukee • Cleveland • Greenwich, Ohio

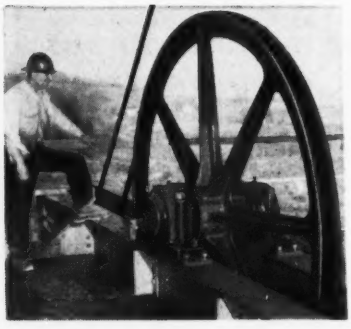


Roller-Bearing Electric Hoist for metal mine, assembled in Vulcan shop. To be driven by dual 250 hp. motors (not shown in illustration) through flexible couplings and single-reduction herringbone gears running in oil. Main shaft and pinion shafts mounted in spherical-roller-bearing pillow blocks. All operating levers and instruments grouped at control desk on floor level.

Equipped with parallel-motion post-type brakes on each drum and toothed-type positive clutch on one drum. Brake and clutch engines operated by oil-hydraulic pressure. Clutch and brake on loose drum mechanically and electrically interlocked. All-steel drums are 10′-0″ diam. by 6′-2″ face, with machine-cut grooves for 1609 ft. of 1⅜″ rope in one layer. Each drum is equipped with a gear-driven safety controller which provides complete protection for hoisting from several different levels.

For Faster, Safer, Hoisting... Rely on

VULCAN HOISTS AND SHEAVES



Vulcan Allcasteel Sheave pressed on alloy-steel shaft and mounted on self-aligning "spherical" roller-bearing pillow blocks. Besides being light and very strong, Vulcan Allcasteel sheaves are so resistant to rope wear that liners are seldom needed. Manganese steel liners are furnished, however, when required. All sizes are available with either plain or anti-friction bearings.

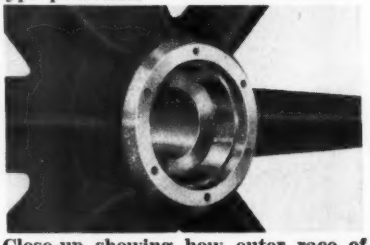
Used by leading mining companies for more than a quarter of a century, Vulcan Allcasteel Sheaves have thoroughly proved their superiority for long-time heavy-duty service. Bulletin A-396 (20 fully-illustrated pages) gives complete information.

Vulcan Electric Hoists are available in a wide range of types and sizes, from 5 to 5000 hp., to meet every requirement of the mining industry. Machine-cut steel gears and very sturdy construction throughout, assure long service life with minimum maintenance expense.

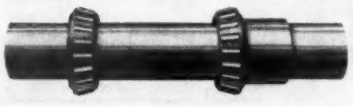
Bed plates and frames can be of either cast iron, cast steel or fabricated steel plate as preferred by the purchaser. Drums can be either cylindrical, conical or cylindro-conical; of either cast iron, cast steel, or "Built-up" all-steel construction. Modern designs and dependable safety devices promote efficient operation and permit high-speed hoisting, when required, without strain on the operator.

Heavy-duty Vulcan hoists are always designed and built especially to meet the purchaser's operating conditions. Self-Contained, Scraper-Loading, Car-Spotting and Room Hoists are available in standardized types and sizes to meet any probable requirement. Bulletin A-407 (32 fully-illustrated pages) gives complete information.

Vulcan Allcasteel Sheaves with tapered roller bearings in hubs. "Dead" shaft is mounted in all-steel clamp-type pedestals.



Close-up showing how outer race of tapered roller bearing is pressed into hub of Vulcan Allcasteel Sheave.



Tapered roller bearing on alloy-steel shaft of Vulcan Allcasteel sheave.

VULCAN IRON WORKS

Main Office and Works WILKES-BARRE, PA., New York Office 50 Church

Heavy-Duty Electric Hoists	Shaking-Chute Conveyors	Steam Locomotives	Load-Carrying Larries
Self-Contained Hoists	Chain Conveyors	Diesel Locomotives	Rotary Kilns, Coolers and Dryers
Scraper Hoists	Cast-Steel Sheaves and Gears	geared and electric drive	Briquetting Machines
Car-Spotting Hoists	Cages, Skips and Gunboats	Gasoline Locomotives	Heavy Special Machinery
Room Hoists	Toothed Double-Roll Crushers	geared and electric drive	Open-Hearth Steel Castings

Goodman

HEAVY HAULAGE LOCOMOTIVES

FOR METAL MINES

MORE THAN ENOUGH POWER FOR THE JOB TODAY— FULLY ADEQUATE FOR A BIGGER JOB TOMORROW

A fleet of these 20-ton, 240 horsepower Goodman Trolley Locomotives has been purchased by a large base metal mine. Capable management has provided these locomotives for handling large tonnages today, with plenty of capacity for the large tonnage and longer hauls that will be tomorrow's program.

If you can use a locomotive in your underground operation, there is a Goodman type to fit the job. Your inquiry is invited.

AT THE LOS ANGELES CONVENTION OCT. 22-24
— for a discussion of your mine haulage, or just for relaxation, you are welcome to visit Goodman headquarters at the Biltmore Hotel.

FEATURES THAT FIT THESE GOODMAN LOCOMOTIVES TO A HIGH SPEED, HIGH PRODUCTION MINE OPERATION

- Two motors—centrally hung, 120 hp. ea.
- Semi-magnetic control
- Roller bearing axle journals
- Transverse equalizers for top track performance
- Straight air and hand brakes, air sanders
- Running drawbar pull—approximately 10,000 lbs.
- Speed at running drawbar pull—8 mph.

Goodman MANUFACTURING COMPANY

HALSTED STREET at 48th • CHICAGO 9, ILLINOIS

CUTTING MACHINES • CONVEYORS • LOADERS • SHUTTLE CARS • LOCOMOTIVES

GIVE THE JOB TO BIG RED TD 24

THE CHAMP "SHOWS ITS STUFF." A fast pass is made on a pile of excess dirt and rock. With this kind of power, Franciose produces about 500 tons of coal a day, the real proof of any tractor's worth.

How International's Big Red TD-24 "Sold Itself" to West Virginia Coal Stripper

A coal stripper can't be told—he has to be sold. And he knows a tractor is worth only what it can do for him.

Dominic Franciose, of the Imperial Coal & Construction Company, now has two International TD-24s in action in West Virginia, with 15 to 60 feet of heavy earth and rock overburden to remove before the 30-inch coal seam is uncovered.

"Our men would rather operate the TD-24," he says, "than any other tractor we have ever used, because it is so easy to run and control. We have yet to encounter any earth-moving job too tough for it.

"It takes grades too steep for the other tractors we have owned. In fact, it backs up almost as steep a slope as it takes in forward speed."

Let your International Industrial Distributor give you the facts on the TD-24 and tell you where you can see the Big Red Champ in action. Watch the Champ work—you'll be a TD-24 man from then on in.

Dominic Franciose, secretary of the Imperial Coal and Construction Company, Rupert, W. Va., stands beside one of two International TD-24 crawler tractors at work on his coal stripping operation in the rugged hills of West Virginia.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL INTERNATIONAL HARVESTER **POWER THAT PAYS**

Goodman BELT CONVEYORS

The Type 99

Built For Moving Heavy Ore At High Speed

Iron ore transported by six belt conveyor flights from car discharge point to skip pocket at main shaft. Five transfer points — two at 90° turns, two at 10°, one in line.

The Goodman Type 99 is not a light duty conveyor with strengthened members, but a unit of rugged construction with all sections designed for heavy duty service.

Here are some of the reasons why the Type 99 has "paid its own way":

EASILY INSTALLED AND EXTENDED WITH MINIMUM OF SUPERVISION — Choice of solid or knockdown style of construction of intermediate sections. Knockdown style particularly adaptable to moving and assembly in narrow metal mine drifts. Compact design of head and tail sections allows maximum head and side clearance. Intermediate section parts jig manufactured for interchangeability, ease of assembly and compact storage.

ACCURATE ALIGNMENT — Design of intermediate framing and method of assembly assure lateral alignment and rigidity without loss of vertical flexibility on uneven floor.

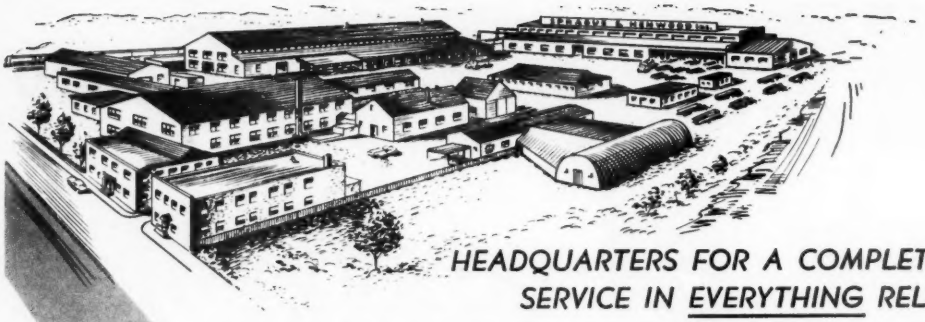
NO ANCHORS REQUIRED— No need to anchor head or tail ends to maintain belt tension. Compression forces caused by belt tensioning are taken up by patented arc butt end joints in side channels.

COMPLETE ELECTRICAL UNITS — Motors of suitable horsepower are available. Control systems including sequence control, belt slippage protection, emergency switches, load limit switches, brakes and automatic loading points are also obtainable.

Goodman belt conveyors today are profitably moving iron ore, copper ore, potash and coal. Perhaps they will help cut costs at your mine. Your inquiry is invited.

AT THE LOS ANGELES CONVENTION, OCT. 22-24
—for a discussion of your mine haulage, or just for relaxation, you are welcome to visit Goodman headquarters at the Biltmore Hotel.

Goodman MANUFACTURING COMPANY
HALSTED STREET at 48th • CHICAGO 9, ILLINOIS
CUTTING MACHINES • CONVEYORS • LOADERS • SHUTTLE CARS • LOCOMOTIVES



HEADQUARTERS FOR A COMPLETE WORLD-WIDE SERVICE IN EVERYTHING RELATING TO

DIAMOND CORE DRILLING

Sixty years of successful experience, backed by ample plant facilities and financial resources, enables us to manufacture Drilling Machines that can be relied upon for long periods of continuous high-speed operation with the greatest possible percentage of good core recovery.

DRILLING MACHINES

and Complete Accessory Equipment for Core Drilling and Dry Sampling

Model 40-C Core Drilling Machine with Gasoline Engine Power Unit and oil-operated Hydraulic Swivel-head. Other Models are shown in our bulletins and in our "Mining Catalog" insert.

"TRUCAST" BORTZ DIAMOND BITS

have proved their superiority for years in all types of rock formation. Set with any desired grade of bortz diamonds in a matrix of either copper or nickel alloy and available in a wide variety of standard and special types and sizes, ranging from 1-1/2" to 7-3/4" in diameter. Write for Bulletin No. 44-A.

MODERN design, rugged construction, liberal use of alloy-steel parts and anti-friction bearings throughout minimize time losses and operating expense. Swivel-head can be either "Screwfeed" or "Hydraulic". Power Unit can be either a gasoline or a Diesel engine, an air engine or an electric motor — each driving the Swivel-head and Hoisting Drum through a built-in four-speed sliding-gear transmission. A complete line of improved accessory equipment provides for every drilling and sampling requirement. Write for Bulletin No. 185.

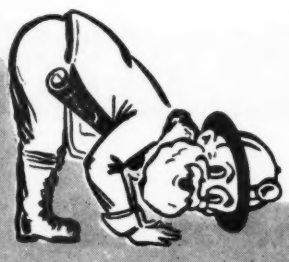
CONTRACT DRILLING *anywhere in the world*

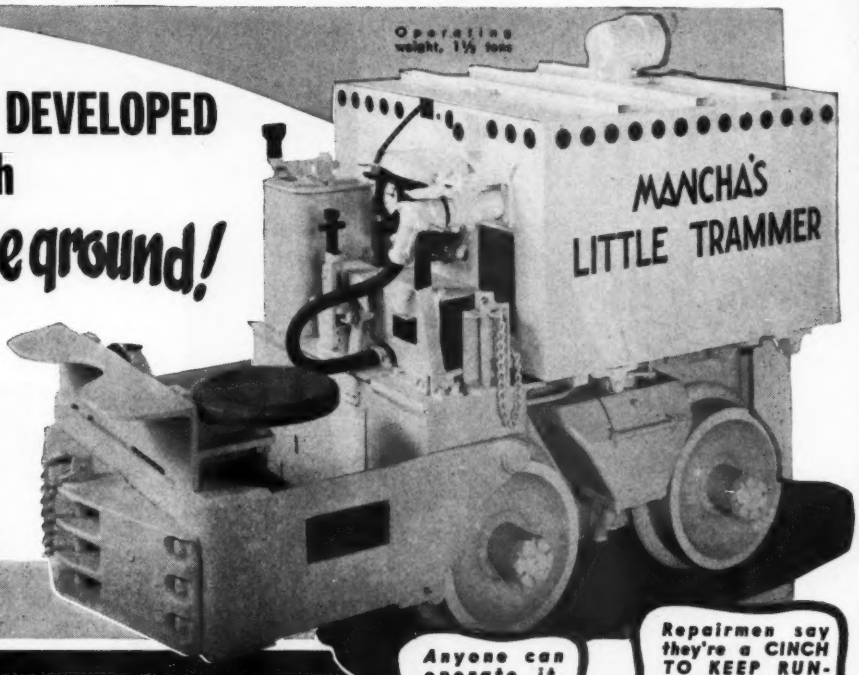
Besides being manufacturers we are one of the largest contractors for any type of Diamond Core Drilling. This includes exploratory drilling for coal and ore, foundation-test drilling for bridges, dams and other heavy structures, grout holes and pressure grouting. Experienced crews and supervisors are available at all times — for service anywhere in the world. Estimates, and constructive suggestions whenever possible, submitted promptly on request.

SPRAGUE & HENWOOD, Inc., Scranton 2, Pa.

Branch Offices: NEW YORK . PHILADELPHIA . PITTSBURGH

DESIGNED and DEVELOPED with an ear to the ground!





For the remarkable working efficiency of

MANCHA'S LITTLE TRAMMER,

mine personnel deserves much of the credit. Throughout the years, Mancha engineers have kept their ears to the ground, listening to mining men whose suggestions helped improve and perfect this powerful little locomotive. The *simple construction* and *trouble-free operation* of Mancha's Little Trammer today represent the pooled experience of mining men who contributed ideas to make the Little Trammer ever better.

By *keeping* their ears to the ground, Mancha engineers incorporated in the Little Trammer such mine-proved features as these:

- Simplified design; easy operation; easy accessibility.
- Simple, one-piece welded main frame.
- Powerful single motor.
- Track gauge (18"-30") easily changed *at the mine*.
- Adjustable brake; trouble-free controller.
- Fittings to permit a 3-minute battery change — without manual labor.

Anyone can operate it. Motormen say they're EASY TO RUN.
Repairmen say they're a CINCH TO KEEP RUNNING. Just ask the men who maintain them.

AT THE LOS ANGELES CONVENTION OCT. 22-24

—for a discussion of your mine haulage, or just for relaxation, you are welcome to visit Goodman headquarters at the Biltmore Hotel.

Mail the coupon for complete information about Mancha's Little Trammer.

Mancha Storage Battery Locomotive, U.S.A.
Division GOODMAN Manufacturing Company
4850 South Halsted Street, Chicago 9, Illinois
MCJ—10-51

NAME _____

FIRM _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

MANCHA STORAGE BATTERY LOCOMOTIVE

Division **GOODMAN** *Manufacturing Company*

4850 SOUTH HALSTED STREET · CHICAGO 9, ILL., U. S. A.

MUSCLE MEN
of the Mines...

AIRDOX

Let One of Them Show How NON-EXPLOSIVE MINING Will Pay in Your Mine

Either of these outstanding Non-Explosive Mining Methods will bring a whole string of advantages to your mine—Airdox or Cardox. Both are ready to cut operating costs by applying the non-shattering force of compressed air (Airdox) or expanding carbon dioxide (Cardox) at the *back*

CARDOX-HARDSOCG AUGER MINER

Drive unit and Cardox-Hardsocg Augers salvage countless tons where over-burden became too costly to remove and further stripping was halted. Augers 20 to 40 inches in diameter draw the coal in a continuous flow from the seam. See in the picture how addition of a portable conveyor makes this a continuous operation, loading into trucks or cars automatically.

CARDOX

of a simple drill hole. This kind of shot will heave out the coal by irresistible power without the violent impact of explosives.

Add up the advantages: Increase in sales realization . . . Preservation of roof structure . . . Increase in loading efficiency at working face... Reduction of maintenance on loading equipment . . . Elimination of fines with resulting reduction in cleaning costs . . . Achievement of new safety —in working conditions which permits on-shift shooting in many mines—in coal handling all the way to the plant by elimination of the hazard of detonator caps lost in the coal.

AIRDOX or CARDOX? Which? There will be some edge of one over the other depending on conditions at each mine. The choice is a technical decision between our engineers and yours. Write and get the facts on both methods.

CARDOX-HARDSOCG Cutterheads

Cardox-Hardsocg Cutterheads are available with replacement bits ranging from 2½ inches to 3 inches in diameter.

Other Cardox-Hardsocg Drilling Equipment

Augers—in a range of sizes
Bits—Wedges
Threadbars—Sockets
Boxing and Boxing Liners

CARDOX
The Non-Explosive Mining Method

CARDOX CORPORATION

BELL BUILDING • CHICAGO 1, ILLINOIS

"EUC" PERFORMANCE Pays Off

IN MINES and QUARRIES

"Eucs" are designed and built for moving coal, rock, ore, overburden and heavy excavation at the lowest cost. The simple but rugged construction of Euclids, combined with large capacity, ample power and speed, provide efficient off-the-highway hauling of practically any material.

Euclids are standard equipment in many leading open pit mines and quarries, and on construction and industrial work. Owners know that Euclid staying power and continuous operation result in more loads hauled in less time at lower cost.

Ask your Euclid distributor for data on quarry or open pit jobs similar to yours. There is a Euclid to meet your requirements for off-the-highway hauling work.

Rear-Dump Euclids—Capacity from 10 to 34 tons—diesel engines from 125 to 400 h.p., spring mounted or semi-rigid drive axles—top speed loaded up to 35.7 m.p.h.

MORE LOADS PER HOUR— MORE PROFIT PER LOAD

The EUCLID ROAD MACHINERY Co., Cleveland 17, O

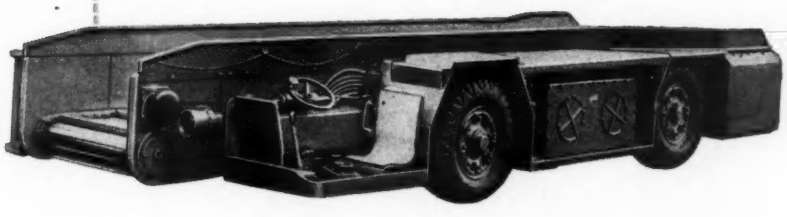
EUCLIDS

Cold Facts about Securityflex

COLD RUBBER

Insulated Cable for your mine

It's the ***toughest*** *shuttle car cable you can buy*



It's tougher to short circuit!
It's tougher to cut!
It's tougher to crush!
It's tougher to abrade!
It's tougher to break!
It's tougher to permeate with water!
It's tougher to fatigue from repeated short radius bending!

Anaconda *specializes* in the manufacture of shuttle car cable and cable for the new continuous mining machines. Let us show you this famous SECURITYFLEX* Shuttle Car Cable with cold rubber insulation—and tell you what it can do in your mine. Just send a note to your nearest Anaconda Sales Office or Anaconda Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York. 51260

*TRADEMARK

the right cable for the job **ANACONDA®**

WIRE AND CABLE

Outstanding

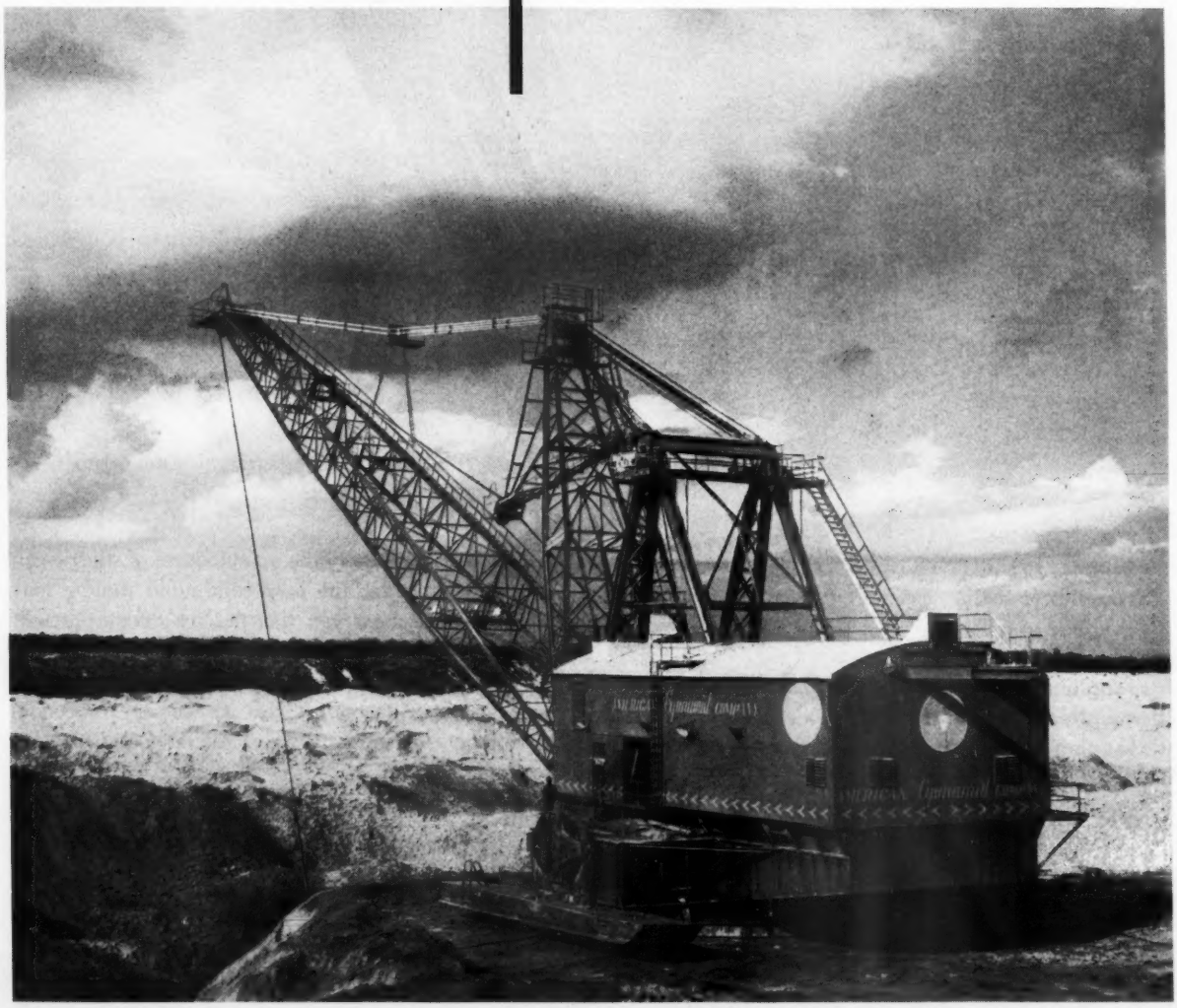
BY EVERY STANDARD OF COMPARISON

Use any yardstick you wish to measure the worth of an excavator — range, capacity, speed and ease of control, durability, low maintenance — or that all-important criterion: steady, big-output performance. You'll find that Bucyrus-Eries rate "outstanding" on all, because their advanced design and construction is backed by unequalled experience in building excavating machinery for use all over the world. A complete line of shovels, cranes, draglines, stripping shovels and walking draglines from 2½ to 36 cubic yard sizes provides a machine to fit any job requirement.

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

144L51



the trend is to

WHEAT

What to Look for

IN SELECTING A MODERN ELECTRIC CAP LAMP

(One of a series of informative advertisements on Better Light for the Miner)

✔ FULL-SHIFT ILLUMINATION

A most important point to check! Light levels which lower appreciably during the shift defeat the purpose of better illumination, cut production and increase operator fatigue.

Wheat lamps maintain a very high percentage of initial light efficiency right through the end of the shift.

✔ LIGHT OUTPUT AND WEIGHT

Large battery capacity, permitting a high amperage bulb, is a most desirable feature. It should not carry a penalty of excessive battery weight.

Wheat lamps deliver high light output without bulky battery size or cumbersome weight, through space-saving flat positive tubes. The standard "Forty-Niner" weighs only 80 ounces.

✔ MODELS FOR EVERY NEED

A single model lamp may be right for some mining jobs, yet too large or too small for others. You benefit where model choice exists.

Wheat lamps are available in three models: the standard "Forty-Niner" for regular duty, the "M" for machine men requiring greater, more intensive illumination, and the "Q" where extremely light weight and smaller size is desirable. Each model charges from the same rack, is capable of good continuous full-shift performance, and admirably suited for its particular field of application.

✔ FULLY AUTOMATIC CHARGING

Low-cost lamp service is affected strongly by lamphouse arrangements for charging and distribution. True automatic charging is vitally essential!

Wheat lamps provide the only genuinely automatic charging. Miners place their own lamps on charge, more quickly than turning them in to an attendant—and each lamp takes the amount of current necessary to re-charge it—and no more; the rising counter voltage of the battery gradually reducing the current supplied. All this is done automatically without manual attention.

National Mine Service Company

Has the Facilities—Delivers the Goods

BEMECO DIVISION
Beckley, W. Va.

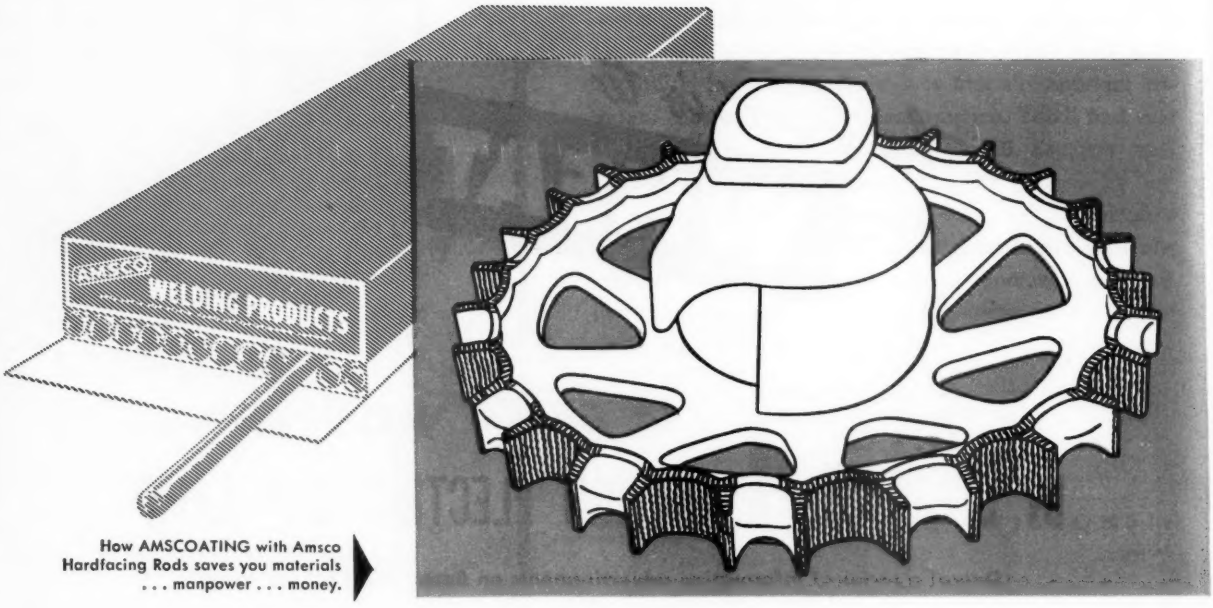
ALL-STATE DIVISION
Logan, W. Va.

WHITEMAN DIVISION
Indiana and Altoona, Pa.

KY.-VA. DIVISION
Jenkins, Ky.

ANTHRACITE DIVISION
Forty Fort, Pa.

WESTERN KY. DIVISION
Madisonville, Ky.



How AMSCOATING with Amsco Hardfacing Rods saves you materials . . . manpower . . . money.

These teeth take bites out of repair costs!

AMSCOATING...stands for control of wear by Hardfacing...

Hardfacing rods—and recommendations for their use—are as sound as the manufacturer who makes them. AMSCO has been fighting wear for a half-century—first with Manganese Steel, and later with AMSCO Hardfacing Products.

If you have a problem of wear caused by impact, abrasion, heat or corrosion . . .

Find out how AMSCOATING can save you materials . . . manpower . . . money!

AMSCOATING can make old Tractor Drive Sprockets last 3 times longer than new.

Here's another way to beat the high cost of replacements, down-time and maintenance . . . AMSCOATING the teeth on Tractor Drive Sprockets. Time after time service records have shown that AMSCOATING of sprockets results in these dollar-saving advantages:

1. ***On an average — 3 times the service life of a new, unhardfaced sprocket.***
2. ***2 out of 3 sprocket changes completely eliminated . . . far less down-time, less maintenance . . . more equipment out of the shop and on the job.***

To top it off, sprocket replacements can practically be eliminated. An AMSCOATED sprocket can be reclaimed over and over again . . . *at about half the cost of a new one!*

Get all the facts on how to make these big savings . . . write today for instruction sheet on AMSCOATING sprockets, and the name of your nearest AMSCO Distributor.

AMSCOATING

THE RIGHT WAY TO SAY HARDFACING

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION

422 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

New 24"-high loader works 30" seams with gathering head on TIMKEN® bearings

WITH this new Joy Manufacturing Company 24"-high, 20BU Loader, it is now possible to get coal out of shallow seams only 30" high. It has a capacity of 5 to 8 tons per minute, and incorporates a completely new type gathering head that is equipped with 24 Timken® bearings. The new gathering head has a bevel gear drive which makes the unit very rugged and very quiet.

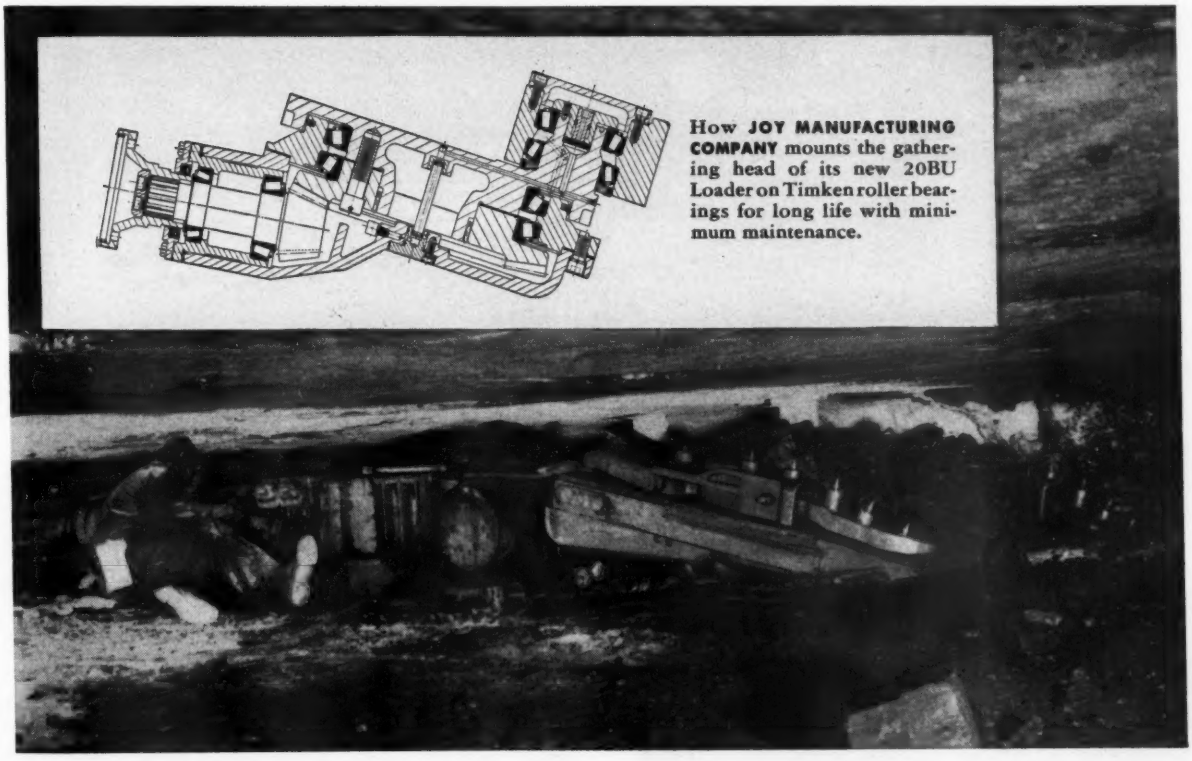
Twelve more Timken bearings are used throughout the loader at vital spots. Timken tapered roller bearings keep gears and pinions meshing smoothly and accurately. Friction is minimized.

Because of tapered design, Timken bearings carry both radial and thrust loads. Shafts are held in proper alignment, reducing wear on moving parts. Due to line contact between rollers and races, Timken bearings have extra load-carrying capacity. Frictionless operation is assured by their true rolling motion and incredibly smooth surface finish.

Timken bearings make closures more effective because they hold housing and shaft concentric—dirt and coal dust are kept out; lubricant kept in. Lubrication time and maintenance are kept to a minimum. Timken bearings are made of Timken fine alloy steel and case-hardened for maximum wear resistance. Normally they last the life of the machine.

On any machine you build or buy, be sure to ask for Timken bearings. Over 50 years of bearing research and development have made them first choice in industry. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **JOY MANUFACTURING COMPANY** mounts the gathering head of its new 20BU Loader on Timken roller bearings for long life with minimum maintenance.

WE MAKE OUR OWN STEEL

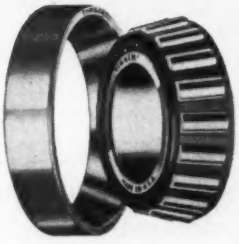
The special grade alloy steel which gives Timken bearings their strength and resistance to wear is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

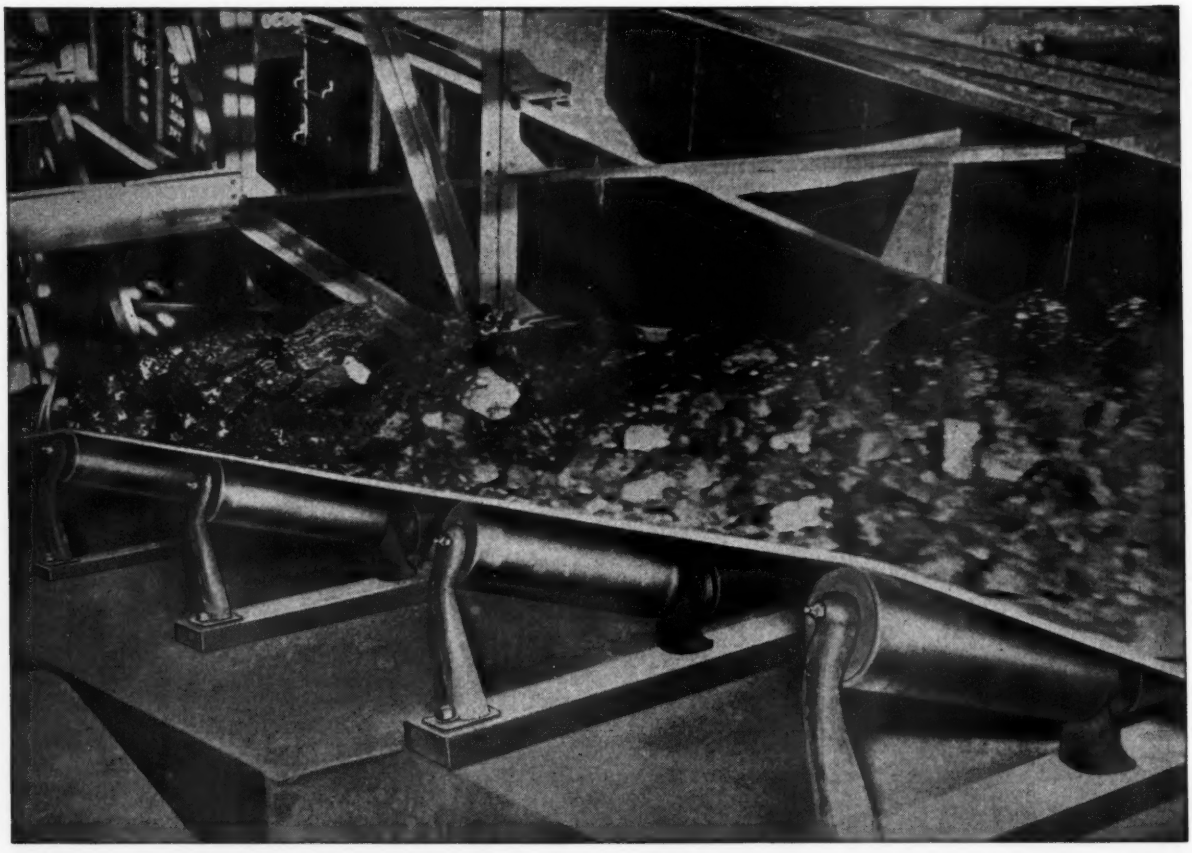
TRADE-MARK REG. U.S. PAT. OFF.

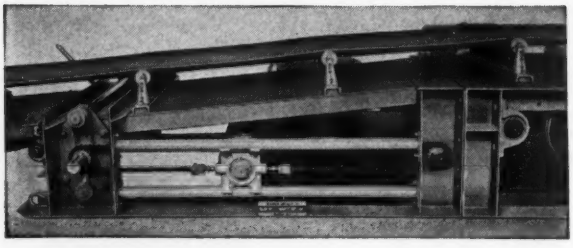
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◎ AND THRUST →◎← LOADS OR ANY COMBINATION ✳

ONLY ONE FIRM TAKES FULL MINE CONVEYOR PERFORMANCE



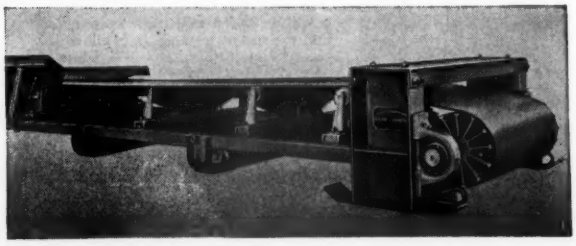


INTERNAL TAKEUP

Located directly back of the drive. Handles 10′ of belt slack. Operated by reversible ratchet-wrench working on gear reduction to minimize manual effort. Double-acting pawl prevents backing-up. Worked from either side of conveyor.

TAIL SECTION

Telescopic type to provide tail takeup action. Easy to clean out—no steel work under tail pulley. Has transverse cover to protect pulley, bearings *and belt.* Strong enough so you can rest a feeder on it.



RESPONSIBILITY FOR COMPLETE

. . . only HEWITT-ROBINS makes and guarantees both machinery and belt

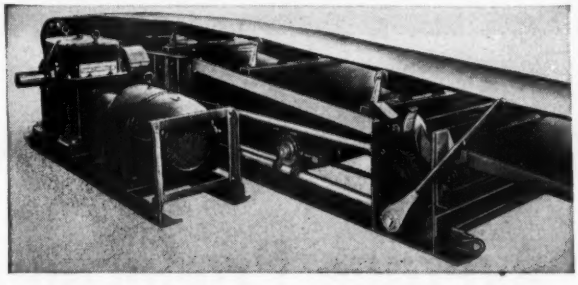
No longer need you worry about your Mine Conveyor operation—wondering who will be responsible for the successful, *lasting* performance of its machinery *and belt.*

Get your Mine Conveyor from Hewitt-Robins. Here is a company—the only company in all the world—able *and willing* to take complete *unified* responsibility for the installation. For only Hewitt-Robins makes both machinery *and belt.*

The machinery is the sturdy, strong, substantial construction made by the Robins Conveyors Division and installed in all the better mines. The belt is the long-wearing Ajax® Underground Belt—with mildew inhibitors and acid neutralizers compounded in its wear-resisting rubber covers and high tensile fabrics in its enduring carcass—made by the Hewitt Rubber Division.

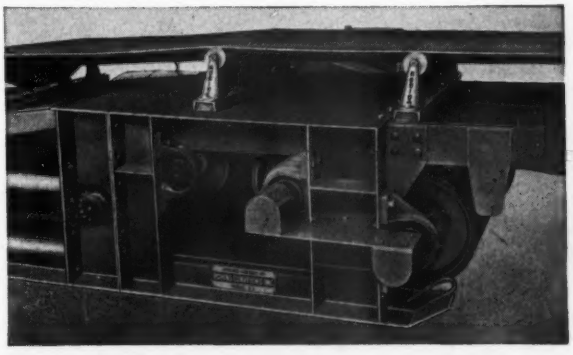
Yes, when you buy a Hewitt-Robins Mine Conveyor you get not only the best elements —machinery and belt—that your money can buy; you also get the satisfaction and peace of mind that come from having one unified source guaranteeing successful performance.

Hewitt-Robins Mine Conveyors can be shipped complete—machinery, belt, motors, reducers and drives—out of stock from Passaic, N. J., and Charleston, W. Va., in belt widths 26", 30" and 36", any desired length. For immediate delivery, get in touch with Hewitt-Robins, Inc., 1010 Pennsylvania Ave., Charleston, W. Va., or 270 Passaic Ave., Passaic, N. J.



UNIFIED DRIVE SECTION

Motor, reducer and controls mounted on a single base—skid-designed for easy moving about. Can be located on either side of the conveyor. Drive reversible—incoming for men and material, outgoing for high output of product.



SINGLE OR TANDEM DRIVE

Hewitt-Robins Mine Conveyors come equipped with *both* single and tandem pulley drive elements. Provide ample horsepower for lift and length up to the very limits of belt capacity. Reeving of belt handles level, uphill or downhill service requirements.

HEWITT-ROBINS
MINE CONVEYORS

HEWITT-ROBINS INCORPORATED

BELT CONVEYORS (*belting and machinery*) • BELT AND BUCKET ELEVATORS • CAR SHAKEOUTS • DEWATERIZERS • FEEDERS • FOAM RUBBER PRODUCTS • FOUNDRY SHAKEOUTS • INDUSTRIAL HOSE • MINE CONVEYORS • MOLDED RUBBER GOODS • RUBBERLOKT ROTARY WIRE BRUSHES • SCREEN CLOTH • SKIP HOISTS • STACKERS • TRANSMISSION BELTING • VIBRATING CONVEYORS, FEEDERS AND SCREENS

Progress Report on the JOY

SIZE	SIX CUTTER CHAINS CHANNEL LACING	ROTARY DRUM HEAD	REMARKS
	PER CENT	PER CENT	
+ 6" sq.	3.14	4.73	Sizes above 1 inch increased 55%
6" x 2" sq.	11.49	16.52	
2" sq. x 1" rd.	12.33	19.80	
1" rd. x ½" rd.	19.04	17.28	
½" x 5/16 sq.	8.28	6.19	Sizes below ½ inch reduced 22.5%
5/16 sq. x 8 M.	21.64	17.05	
8 M. x 10 M.	4.28	3.37	
10 M. x 48 M.	12.65	9.82	
48 M. x 200 M.	4.32	3.24	
—200 M.	2.83	2.00	
TOTAL	100.00 NOVEMBER 28, 1950	100.00 DECEMBER 12, 1950	

Tests of New Ripping Development Show 22% less fines in Average Production

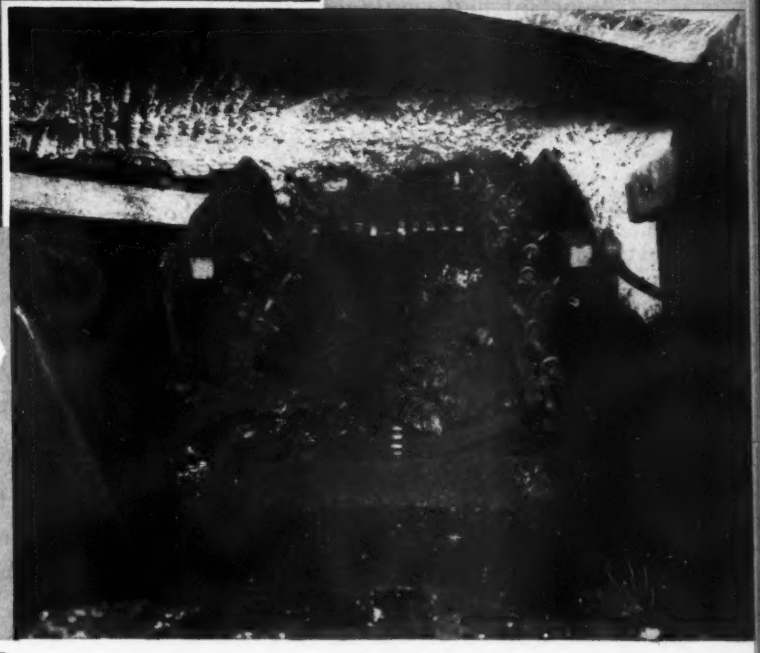
There is not a single machine of Joy manufacture which is not subject to constant research study, engineering development and change. We consider that endless search for improvement is our primary obligation to the mining industry.

An important forward step of this nature has now taken place in the Joy Continuous Miner, with the development of a new rotary drum type of ripping head. This rotary head has been in operation underground in the Illinois No. 6 seam, and in the Pittsburgh seam in West Virginia. One of the earlier size consist studies is shown above, comparing the rotary drum head with the original 6-chain head. These favorable results have been fully confirmed by all later tests.

The reduction of more than one-fifth in the coal produced in sizes below ½ inch, with the accompanying large increase in sizes above 1 inch, is a major point, of course. But several other marked advantages have been secured as well, such as: greatly reduced overall maintenance, approximately one-quarter less power consumption, vastly increased bit life and reduced bit cost—all without any sacrifice of tonnage.

CONTINUOUS MINER

A Joy Continuous Miner with the new rotary drum head is shown here in operation in the Pittsburgh seam. Power requirements for the machine are reduced 20 to 30% with the rotary head, providing less load throughout the drive, transmission and control units, and—combined with other improvements in design and materials—assuring a major improvement in overall machine performance.



View of the same machine, looking toward the face from approximately the operator's position, and showing considerable large lump production. The new rotary head contains only about half the number of bits used in the 6-chain head, and in addition, bit life has actually been increased 4 or 5 times. Overall head maintenance is estimated as 40 to 50% less than with the 6-chain head.

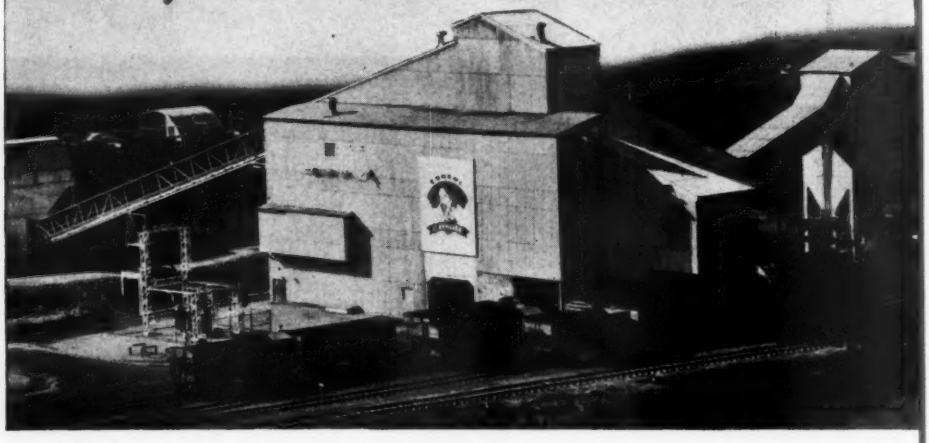
Consult a Joy Engineer

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

BIG RETURNS FROM DAILY 3-SHIFT OPERATION



The Hendrix Mine of Consolidation Coal Company (Ky.) is an excellent example of efficiency for the reason that it is in constant and continuous three-shift operation. This procedure results in high daily shipments with the lowest possible initial expenditure for plant and equipment.

There is a good reason for this efficiency, of course: modern equipment, carefully engineered, plus pushbutton control.

The entire output of this 250 ton per hour plant is washed. Fine sizes are first dewatered in a centrifuge, then thermally dried.

Special features include windowless construction, artificial ventilation and adequate lighting. A plant operating force of only four men per shift is required.

Here, again is an example of the value of Roberts and Schaefer engineering . . . perhaps you have a problem that involves improved preparation and lowered costs. We are ready to serve you. Your inquiries are invited.

ROBERTS & SCHAEFER COMPANY

130 NORTH WELLS STREET, CHICAGO 6, ILLINOIS

1315 Henry W. Oliver Bldg. PITTSBURGH 22, PA. | P.O. Box 570 HUNTINGTON 10, W.VA. | 254 West 54th Street NEW YORK 19, N.Y.

FOREIGN DEPT.: International Mfg. & Equipment Co., Inc.; 220 Broadway, New York 38, N.Y., U.S.A.

THESE NEW BULLETINS ARE YOURS FOR THE ASKING

Air Washing Coal

This bulletin, No. 175, contains full details about the advantages of air washed coal . . . explains why dry coal has higher B.t.u. . . . how the R. & S. Super Airflow Cleaner separates the dust which may then be recombined with the clean coal or discarded. Detail charts, diagrams and photographs are included.

Wet Washing for Pre-sized Coal

Bulletin No. 176 gives you a comprehensive view of the five basic types of Roberts and Schaefer wet washing machinery. Each has its own particular advantages and applications. Each has its own limitations. Considered together they are capable of meeting any conceivable wet washing requirement. Fully illustrated including diagrams and capacity charts.

The Hardinge Counter-Current Heavy Media Separator

The many advantages that accrue from the use of this modern equipment are discussed in detail in this bulletin, No. 177. Photographs and diagrams show the operating principles and construction features.

Write for any or all of these informative bulletins.

ROBERTS AND SCHAEFER COMPANY
130 North Wells Street,
Chicago 6, Illinois.

Mining CONGRESS JOURNAL

Published for the Entire Mining Industry
by the American Mining Congress
JOHN C. FOX, Editor

OCTOBER
VOLUME 37 1951 NUMBER 10

So You Need Steel

MINES and those who furnish them with machinery and supplies are hard pressed for steel. Mining expansion programs and efforts to increase production in support of the defense effort have stepped up the need for this vital material.

It is estimated that the coal mines will increase their 1951 production by 11 percent over 1950.

Metal and nonmetallic mineral mining companies are engaged in expanding production facilities to meet the vastly increased demand for their products. New mines of all descriptions will be opened and dormant properties rehabilitated. All this plus increased mechanization, underground and on the surface, will call for more trucks, more drilling and blasting equipment, more miles of track, bigger and more efficient coal cleaning and ore beneficiation plants. All these mean steel, steel and more steel.

In 1950 steel producers set a record of 96,700,000 tons output. Production facilities are being expanded to permit an annual rate of 117,500,000 tons by the end of 1952. In the Spring of this year the steel industry was already producing at the rate of 104,000,000 tons and by the end of 1951 capacity should reach 107,000,000 tons.

Steel making requires one ton of ferrous scrap for every two tons of steel turned out. This comes from two sources, plant scrap and purchased scrap. Plant scrap is the trimmings, machinings, etc., that accumulate around the steel mills, and purchased scrap comes from sources outside the industry.

Original estimates of ferrous scrap requirements for 1951 called for 32,500,000 tons. This was later revised to 36,000,000 tons. Even more will be needed in 1952. Of course, steel could be made entirely from new pig iron but the process is necessarily slower and every ton of scrap used means a saving of one ton of coal, two tons of iron ore and about one ton of limestone and other materials—four tons of hard-won natural resources.

The expansion of steel production has put a tremendous drain on the inventories of scrap on hand at all steel mills. Stocks are at a dangerously low level, with many steel mills and foundries operating on a hand-to-mouth basis. Current collections are not enough to maintain rapidly depleting inventories, let alone build them up for the winter months ahead when cold weather makes scrap collection and preparation difficult and often impossible.

The National Production Authority has therefore issued an appeal to the nation to *get in the scrap now* while the weather holds good and the regular channels of scrap commerce are still open. *Immediate action is of prime importance.*

In the mining industry mechanization has progressed rapidly since World War II. New and more efficient mining and preparation equipment have rendered older units and stocks of parts and supplies obsolete. The wrecking of these and routing of the resulting scrap to the steel mills in many cases waits only the decision of some responsible representative of management. Every mining company should delegate this responsibility to a competent man forthwith. He should have full power to direct that all machinery or equipment which has outlived its efficient utilization is scrapped and turned in promptly. Thus heavy scrap, the objective of this drive, will be started on its way to the mills and foundries where it is so sorely needed. More steel will be made, to return to the mines as new, more efficient equipment and supplies.

Not only a patriotic duty, the junking of obsolete machinery is good economics. The dollars realized from its sale are more useful than rust.

Most companies have a definite salvage program but the tendency to grow lax in its administration is general. There is always the thought, "that might come in handy some day." Remember, if it is not in use now it probably never will be. Junk it.

"More scrap today means more steel tomorrow."

Get Your Money's Worth

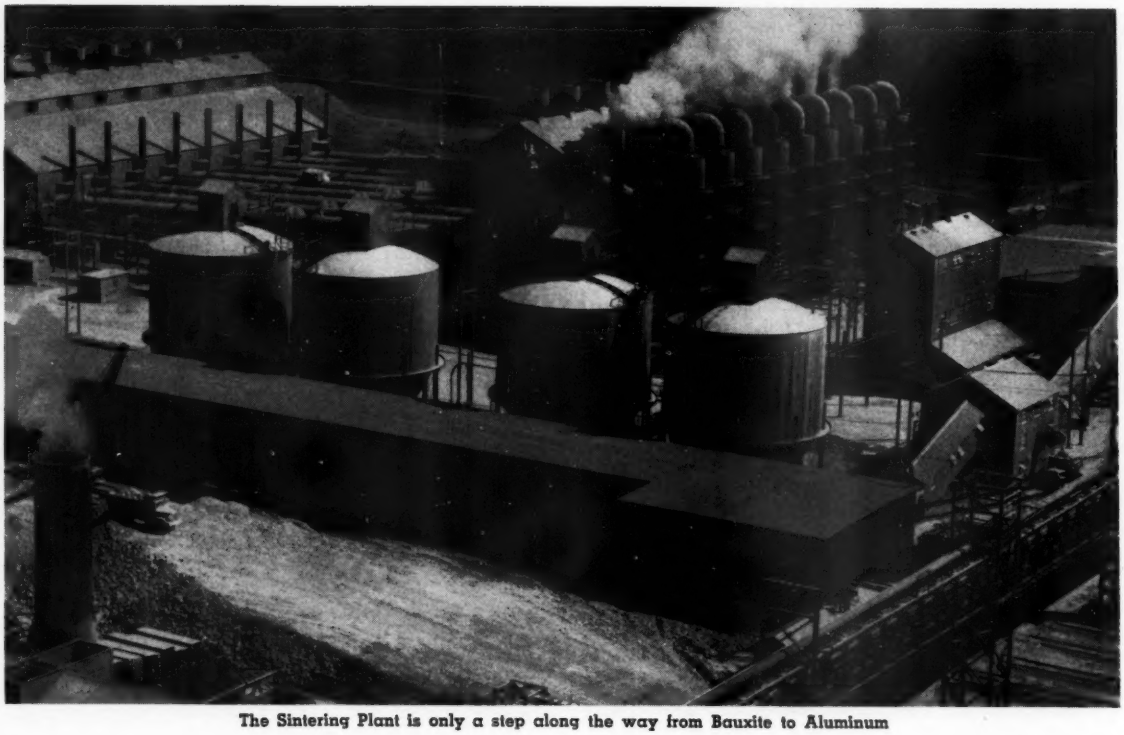
THE 1951 Metal and Nonmetallic Mineral Mining Convention offers a unique opportunity for mining men to profit from the experience and know-how of the best minds in Government and industry.

Those who attend invest several valuable days and a certain amount of cold cash. The prescription, to make this a paying proposition, is contained in the pages of this, the Pre-Convention, issue. Study them carefully.

Each mining man should plan to take part in those sessions dealing with the problems of major importance to his job. An advance memo of the questions he wants answered and the problems he wants aired will serve as a reminder during discussion periods and corridor shop-talk.

Although business is the Convention's basic theme, behind the lighter side of the program, also, lie months of hard work and preparation. Convention visitors will reap the fruit of these as they enjoy the brilliant social events and visit the important mining operations and other points of interest.

Make the trip to Los Angeles pay off by taking full advantage of the many opportunities offered. In October all roads lead to the City of the Angels. Be there and take home a full measure of new insight into national affairs as they affect mining, the latest operating know-how, and pleasant memories of hours spent in congenial company.



The Sintering Plant is only a step along the way from Bauxite to Aluminum

Processing Aluminum Ore

How Metal, Vital to the Defense Effort Is Extracted from Bauxite

By EVANS W. BUSKETT,
Consulting Engineer
Joplin, Mo.

ORES of copper, lead and zinc are usually sulphides and must be roasted to remove the sulphur and convert them into oxides which are then reduced to the metals. Iron occurs in commercial quantities as oxide and often can be smelted without preliminary treatment, except washing to eliminate the silica and clay. Aluminum, on the other hand occurs in hydroxide form with iron, silica and titanium oxide as impurities. All are undesirable in aluminum metal. They also form alloys, for which there is no known commercial use, in the electrical reduction pot. No practical method of separating them there has yet been invented. It is necessary, therefore, to treat the ore chemically to produce an oxide that will permit the extraction of the metal in a pure state.

To accomplish this the Bayer process is almost universally used, modified to suit the needs of particular ores. This process was invented by Carl Josef Bayer, a German metallurgist who was granted a German patent for his process in 1888 and a United States patent in 1894. Although there have been minor improvements, the process used today is essentially the same as the one covered by Bayer's original patents.

Basically the process consists in dissolving aluminum hydroxide in a solution of sodium hydroxide to form sodium aluminate and water. This step eliminates the iron oxides as they are unaffected by the sodium hydroxide. The silica, however, causes losses of both aluminum and sodium hydroxide through the formation of sodium aluminum silicate. These losses may be very high since the red mud which settles out of solution may be 80 percent sodium aluminum silicate. Much of this is recovered through retreatment of the red mud. Loss of valuable constituents when silica is present accounts for the high penalty charged against ores containing large amounts of it and the premium paid for ores which are low in this material.

CLASSIFICATION OF ORE FOR BUYING

Premiums	
For each percent, alumina above 50	14 cents
For each percent, silica below 13	20 cents
Penalties	
For each percent, alumina below 50	14 cents
For each percent, silica above 13	43 cents

Bauxite, as received at the Bayer plant, is a mixture of mono and trihydrates. It is dried at the mines so it contains practically no uncombined moisture. The alumina content usually ranges from 50 to 60 percent. First the ore is crushed in hammer mills to 1½ in. in closed circuit, the product of which goes to storage beds. On its way to the storage beds the crushed bauxite is accurately weighed and a sample taken automatically. Bridge conveyors deposit the bauxite in layers of about 250 tons each. Each bed holds 15,000-20,000 tons. From storage it passes over a weightometer and is fed to a ball, or rod mill. So-

dium hydroxide in weighed amounts is added to the bauxite and the carefully proportioned mixture goes to a series of three digesters. Spending 20 minutes in each digester, the sodium hydroxide and bauxite become thoroughly mixed. The intimate contact thus provided encourages chemical reaction which proceeds until all of the alumina has combined with sodium to form sodium aluminate in solution. Lime and starch are added to the mixture, the lime to neutralize any excess sodium hydroxide and the starch to assist in settling the red mud. The solution as it is discharged from the digesters contains 6 percent red mud. From the treatment, one ton of bauxite yields about 0.3 tons of red mud. Heat, necessary for the digestion process, is furnished by steam at 125 pounds pressure. The temperature in the digester may be as high as 300° F. The iron and titanium are unaffected by the digestion process and form "red mud" which also contains sodium aluminum silicate formed when any silica present reacts with the solution.

Filter Solution

When the pressure is released the temperature in the vessel drops to below 212° F. To remove sand and other solids the solution is sent to a conical tank, where they are settled and drawn off at the bottom of the cone. Further treatment in classifiers results in recovery of more of the solution. During the digestion process it is necessary to maintain the strength of the solution at the normal point. This is from 1.5 to 1.6 mol Na_2O to 1.0 mol alumina.

Sodium aluminate in solution is separated from the red mud by thickening it in insulated tanks. From these primary thickeners the underflow goes to washing thickeners, and the underflow from these to Oliver filters. The red mud cake is then pulped with water and pumped to the storage pond. Retreatment of red mud will be discussed at the end of the Bayer process.

Overflow from both series of thickeners goes to storage tanks. From these tanks it is pumped under pressure of 40 psi to a series of pressure filters. These are closed cylinders with perforated metal screens covered with a filtering medium through which the solution is circulated until it is clear. When the filters become so clogged with solids that the volume of the filtrate coming through is small, they are washed and the pulp and precipitate discharged. At intervals the filters must be taken apart and the screens thoroughly cleaned.

Precipitate Alumina

Solution temperature leaving the filters is too high for precipitation, so the liquor is cooled in heat exchangers to a temperature of 140° to 170° F and then goes to precipitation tanks, about 60 ft high, which hold approximately 200,000 gal. These are of the Pachuca type with a conical bottom and discharge valve, and a central air lift. Precipitation occurs when the temperature of the solution reaches 120-140° F, and is hastened when a seed solution is added containing in suspension finely divided aluminum hydrate. These combined solutions are agitated by the air lift in each tank for 24-30 hr. The particle size of the precipitate is regulated by the temperature of the solution, size of the seed particles and concentration of the seed solution. Precipitation is a batch process.

After precipitation is complete the charge goes to a Dorr hydroseparator, where the fine and coarse precipitates are separated. The fine particle overflow goes to a Dorr multi-deck separator, from which the clear liquor passes through evaporators and heat exchangers to the solution storage. Underflow goes to the seed solution storage tanks.

Underflow from the Dorr hydroseparators goes to Dorr classifiers. The finished product is washed in Conkey vacuum filters. The filter cake contains about 20 percent moisture and 35 percent combined water. The aluminum hydroxide cake is practically free from impurities and will yield a high-grade metal.

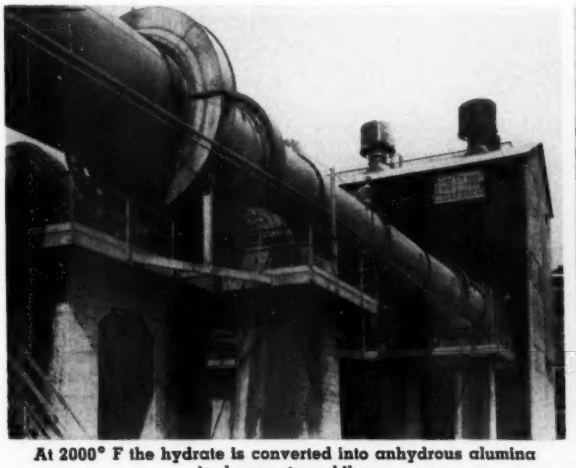
The cake is conveyed to the calcining kilns, fired by oil or gas. These kilns are 150-200 ft long and 7.5-9.5 ft inside diameter. They are lined with brick except for the first 20 ft. The temperature for the disintegration of the hydrate into alumina and water is 1800° F, but the temperature of the kilns may reach 2100° F.

The alumina leaves the kilns hot and is cooled in Allis-Chalmers multiple-tube coolers. Air is supplied to the coolers by fans. This air, hot when it leaves the coolers, is used in burning the kiln fuel. The alumina is screened through a 60-mesh screen, weighed, and stored in tanks resembling silos, from which it goes to the reduction plant for reduction to aluminum metal.

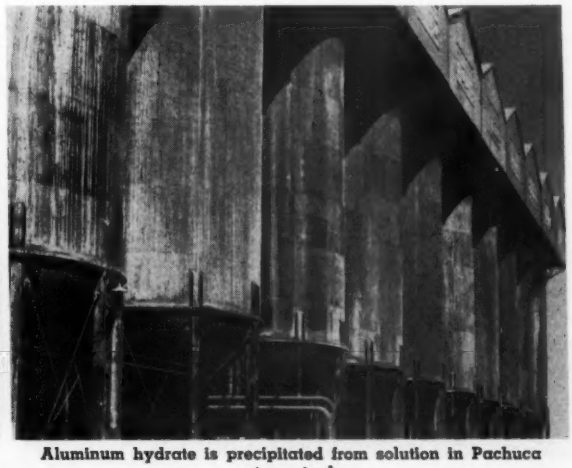
Treat Red Mud

Red mud may contain up to 80 percent sodium aluminum silicate, representing a considerable amount of sodium and aluminum. A process has been developed to recover these ingredients, as sodium aluminate. It consists in heating the sodium aluminum silicate to 2500° F with finely ground limestone and soda ash. This reaction produces sodium aluminate and dicalcium silicate.

Red mud from the filters is repulped with water to make a 50 percent mixture and stored in tanks. The mud is fed from these tanks in measured amounts to three-compartment ball mills. Ground limestone and soda ash are added ahead of the ball mills in proper proportions to react with the amount of sodium aluminum silicate form sodium aluminate. This mixture



At 2000° F the hydrate is converted into anhydrous alumina in long rotary kilns



Aluminum hydrate is precipitated from solution in Pachuca type tanks

is reduced in the ball mills until 90 percent of it will pass a 200-mesh screen. The mixture is pumped into storage tanks and fed from them to sintering kilns. These kilns are similar to those used to sinter alumina in the Bayer process proper. All moisture is driven off and the charge sintered at a temperature of 2500° F. Soluble sodium aluminate and insoluble di-calcium silicate are formed which is fed at a calculated rate into two-compartment ball mills, where water is added to dissolve the soluble ingredients. The slurry from the ball mills is filtered and washed on rotary drum vacuum filters. The brown mud is mixed with enough water to make it flow readily and pumped to the mud lake. The sodium aluminate solution is added to the regular Bayer process, usually ahead of the digesters.

Four tons of run-of-mine ore become two tons of alumina, sodium aluminate, free of iron titanium and silica, when they have passed through the Bayer process. Some alumina is used by industry; most of it, however, is processed metallurgically to provide the light metal vital for civilian and military uses.

Hall Process Standard

Few great developments in art, science and industry have sprung full-fledged from the original idea. This is especially true in metallurgy, where the development of methods of smelting and refining of ores to metals has been a long process. The metallurgy of aluminum is an exception. It developed from the experimental to the commercial form almost at one step. There is little difference between Hall's experimental process and present practice.

Aluminum was first isolated in 1825 by Oersted, a Danish chemist who obtained the metal by heating aluminum chloride with an amalgam of potassium and mercury. Wehler, a German scientist, in 1845 substituted metallic potassium for potassium amalgam. Henri Ste. Claire Deville a few years later produced larger quantities of aluminum than the other experimenters by using sodium metal instead of potassium. Napoleon III even considered using it in place of steel for some purposes in equipping the French army, but not enough metal could be produced at low cost to make this practical.

Anodes are replaced without halting operation of the electrolytic cell

Charles Martin Hall became interested in aluminum when his professor showed the class a sample of the metal and explained its commercial possibilities. The price at that time was about eight dollars a pound.

Hall and his sister set up a laboratory, proceeded to work on alumina and eventually succeeded in reducing the oxide electrolytically to metal after dissolving it in a molten bath of cryolite, which had been melted by passing a direct current of electricity through it. A small plant was put in operation in 1886, and in six years the price had dropped to 57 cents, and now aluminum sells at 18½ cents per pound, fluctuating from 18 to 19 cents according to purity.

At this same time a young Frenchman, Heroult, made the same discovery, and applied for a patent in France. A patent was granted to Heroult in France and to Hall in the United States.

The Hall-Heroult method of producing aluminum electrolytically is much the same process discovered almost 70 years ago. The advances made in the process lie largely in improved equipment and size of units rather than in the process itself.

Aluminum is produced in iron pots in a molten bath of cryolite, either natural or synthetic, through which a low voltage, high density, direct current of electricity is passed. These pots, or cells, are made of steel and measure 16 by 9 by 3 ft. They are lined with carbon which reduces the inside dimensions to 14 ft 8 in. by 6 ft 2 in. by 1 ft 2 in. The lining acts as the cathode in this pot.

Anodes of Carbon

There are two types of anodes, the carbon anode and the Soderberg. Carbon anodes are usually made of petroleum coke—high in carbon, low in ash—with enough pitch to make a binder. These carbon blocks are formed under heavy pressure, and baked. In dimensions they are 20 by 15 by 12 in. and present 310 sq in. of anode area. Their total height is 12 in. In the center of the top of each is molded a large circular hole for the electrical connectors. These are steel stubs which are fixed firmly in the holes when molten iron is poured around them.

The Soderberg anode, like the carbon anode, is made of coke and pitch but with somewhat more tar in the mixture, which is poured into a mantle just above the cell. This mantle or

(*Continued on page* 90)

Molten iron fixes the pin into the top of the carbon electrode

Each potline requires about 35,000 kw to keep cell temperature at 1800° F and separate aluminum metal from the alumina-cryolite mixture

In May, 1950, a 4000 hp gas turbine locomotive, built by Baldwin-Westinghouse, was placed in road operation

Gas Turbine Locomotive*

Research is Developing a Coal Burning Gas Turbine that is Practicable for Railroad Service

FOR the past decade the coal industry has watched with growing concern the increasing use of diesel railroad locomotives which has now reached the point of making serious inroads in the production of coal for railroad fuel. While it is true that comparisons of efficiency and economy which have been given considerable press publicity were in many instances based on performance data of 1951 diesels as against 1925 steam locomotives, nevertheless diesels do have a real place in railroad service and "have come to stay." It seemed that coal was facing a situation from which there was little prospect of relief, but recently another factor has come into play—a limit of the available supply of diesel fuel. This is not the shortage of natural petroleum that coal men have been anticipating but is simply an unbalance in the demand for petroleum products. As a means of diverting some oil consumption from the higher to the lower grades, the gas turbine, which can be operated by burning heavy fuel oil, is coming into prominence. The comparative cost of diesel and heavy fuel oil is also a factor (Fig. 1).

Turbines are not a new development; in fact today's models, whether operated by steam, air or water, can all trace their ancestry back to "the old mill wheel." In its modern form, the gas turbine is a highly efficient device for converting fuel into electricity and is the latest entrant in the prime mover competition. Its rise to prominence in the aircraft field has been as spectacular as that of the Diesel-electric on the rails. The open-cycle gas turbine, the simplest of all prime movers, consists essentially of only a compressor, a combustor where the fuel is burned in the compressed air and a turbine in which the hot air expands, doing enough work to drive the compressor and the generator as well. Addition of a regenerator, which transfers parts of the exhaust heat to the compressed air, increases the thermal efficiency approximately 25 percent.

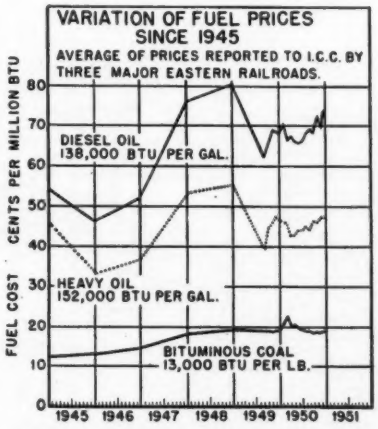
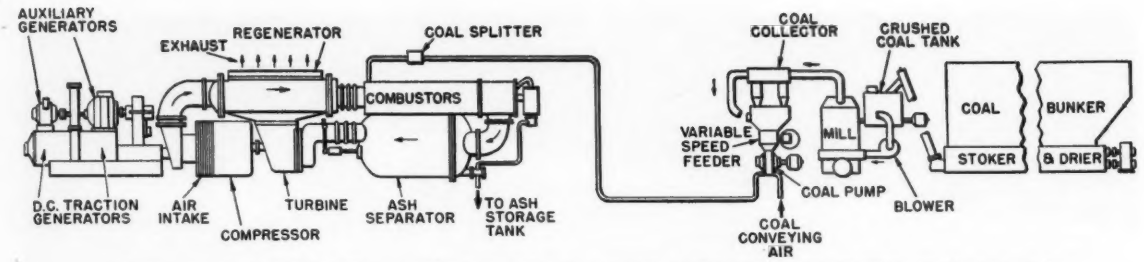


Fig. 1—Comparative cost of diesel, heavy fuel oil and bituminous coal

For the first time in power generation history an opportunity to burn cheap fuels at high efficiency in a simple, waterless plant is provided by the gas turbine. Its reliability has been demonstrated by years of continuous operation in oil-refinery applications; its high performance has been attested to by both land and marine installations; and its suitability for locomotive service is proven by the fact that the first such unit, built by Brown-Boveri of Switzerland in 1939, is still in regular service. More power in less space is possible with gas turbines, and it is interesting to note the following comparison of horsepower per cubic foot of essential space among several typical power plants:

Typical power plants	hp per cu ft
Diesel locomotives	0.535
Destroyers	0.685
Gas turbine locomotives	1.02

* An excerpt from recent publications of the Locomotive Development Committee, Bituminous Coal Research, Inc.



Arrangement of coal handling, combustion and ash removal equipment for the Dunkirk, N. Y. test of Allis-Chalmers turbine

The simplicity of this prime mover and its good thermal efficiency make it immediately a potent competitor in the railroad field. The fact that oil is the presently used fuel might seem at first glance to offer new fields for oil which would be discouraging to coal men, but paradoxically, this development also offers coal an opportunity to meet oil on its own ground, because a turbine does not know or care whether its air is heated by oil, coal or any other fuel.

Recognizing this, the Locomotive Development Committee started a program of research in 1945 with the goal of designing a coal burning gas turbine. During this research hundreds of experiments were run on coal pulverizing, pumping, fly ash separation, ash disposal, combustion, blade erosion—the list seems endless. But a model installation in the Dunkirk laboratory, built to railroad size, is now demonstrating that a coal burning turbine will be practicable for application to railroad service. A brief description of this installation will show how some of the problems have been solved.

Coal Combustion is Difficult

Burning pulverized coal under gas turbine conditions is a three-stage process. First, the coal must be conveyed into the system by a primary stream of compressed air—air-coal ratio must be kept near one pound of air per pound of coal, and the velocity must be above 50 fps to prevent the flame from flashing back. Second, the air-coal mixture must be introduced into the flame tube by a burner which adds the secondary air necessary to support combustion. Third, after combustion is complete, the remaining excess air is added to bring the air temperature down to a usable level.

This three-stage process is further complicated by the fact that the walls of the combustor must be swept by air to keep the metal below 1500° F, but the coal flame must not be allowed to impinge on the walls, which permits the accumulations of ash and slag. Finally, the mixing of the excess air must be done uniformly to prevent stratification and to "freeze" all ash particles.

The Locomotive Power Plant

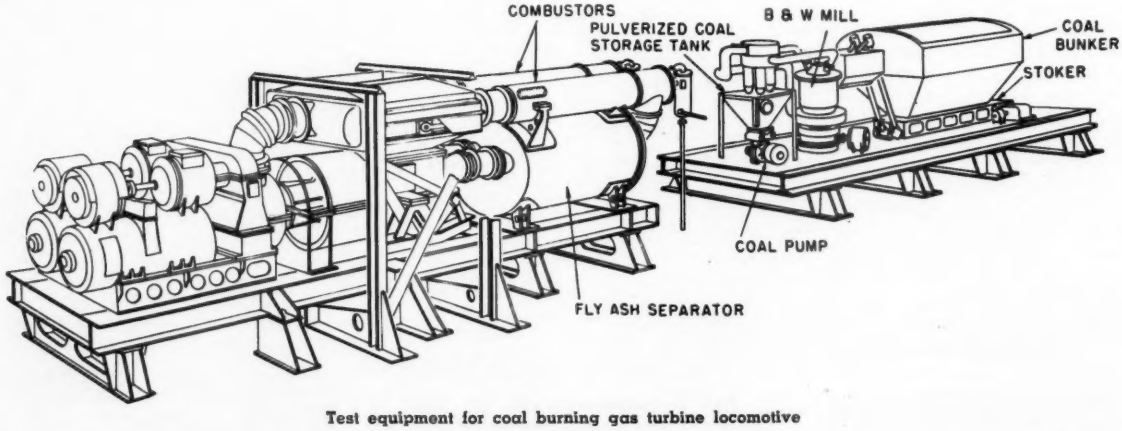
The six-stage reaction turbine of the Allis-Chalmers gas turbine locomotive power plant installed at Dunkirk is designed to operate with 1300° F air at a maximum speed of 5700 rpm, and to produce 14,000 hp, of which about 9750 hp is required to drive the 21-stage axial compressor. The remaining 4250 hp are delivered to the imput shaft of the reduction gear, from which the traction and auxiliary generators are driven.

The electrical system consists of four 1000 hp, 550 volt dc traction generators, driven through a reduction gear at a maximum speed of 2000 rpm. Auxiliary ac generators are mounted above the main traction generators and are driven by separate gears. Traction generators are cooled by drawing air over the armatures at the ends of the shafts, and discharging into a central duct vented through the top of the locomotive.

Burns 70 lb Coal Per Minute

At maximum load, the turbine is expected to use about 70 lb of coal per minute, which means that the crushing and pulverizing system must work continuously to keep the turbine supplied. Coal is moved towards the rear of the bunker, mounted above a stoker and drier, where it is crushed by breaker plates to minus 2 in. and then dried by hot air passing through the drying section countercurrent to the coal flow. Velocity of the drying air is kept quite low so the carry-over of dust will be kept at a minimum. Twin elevator screws carry the coal up to the crushed coal storage tank.

A two-row ball mill driven by a 50 hp motor pulverizes the coal. It is designed to deliver a product, with a size consist of 90 percent minus 200 mesh and 99 percent minus 100 mesh, at the rate of 4500 lb per hr when supplied with coal of a grindability of not lower than 50 Hardgrove.



Test equipment for coal burning gas turbine locomotive

Turbine blade erosion with fly ash was one of the problems overcome in the design of the coal-burning gas turbine locomotive

Crushed coal is fed from the storage tank to the mill by a transverse screw, driven by a two-speed motor, which is operated by a level controller in the pulverized coal storage tank. The pulverized coal is carried from the mill by an air stream supplied by a 3000 cfm blower which runs continuously, and removes the coal as fast as it is pulverized to the required fineness.

Gas Turbine Units In Service

The General Electric Co. built America's first oil burning gas-turbine locomotive at Erie, Pa. This 4500 hp, 250 ton unit was operated on the rails under its own power for the first time on November 14, 1948. It has since seen extensive service hauling freight trains on the Pennsylvania, Nickel Plate and Union Pacific railroads.

Since large blocks of power can be obtained easily and economically from gas turbines as contrasted with diesel engines, it was natural to choose one large turbine set for the prime mover instead of several smaller ones. Equipment on this locomotive included the standard direct current electric drive, one of the major assets of the diesel locomotive. Built to determine the practicability of gas turbine power plants in locomotive service and to produce data on now to handle them, the test unit was made as simple as possible with a minimum of purely experimental features.

The main period of testing was in road freight service on the Union Pacific Railroad. The locomotive was shipped July 28, 1949 and testing was completed March 31, 1951, a period of nearly two years. Regular freight service was begun on the Union Pacific August 22, 1949. From that time until March 31, 1951, the locomotive operated a total of 94,885 miles and produced 344,950,000 gross-ton-miles. A total of 1,448,787 gal of fuel was burned of which 95 percent was heavy oil, with an average of 4.2 gal per thousand gtm, handling an average train weight of 3635 tons. Total mileage on the locomotive since November 1948 is 105,732 and a total of 363,816,000 gtm has been credited to it, including operation on the Pennsylvania and Nickel Plate Railroads.

It has operated at elevations from sea level to 8014 ft above sea level and in ambient temperatures of from 117° F to minus 8° F, in average freight service, with the exception that no local freights were handled. Tonnages have been dictated by motor ratings on long grades. On short grades the locomotive has handled 4500 tons on 1.25 percent grades and 6500 tons on 0.07 percent grades.

In December, 1950, the Union Pacific ordered from the General Electric Co. 10 gas turbine electric locomotives which will be substantial duplicates of the experimental unit, using the same power plant. They will be slightly heavier, averaging 520,000 lb, and have greater fuel capacity with a more flexible arrangement for locomotive hostling. Delivery will begin in the fall of 1951.

Baldwin-Westinghouse has constructed a 4000 hp gas turbine locomotive for passenger service. This unit was also built for experimental purposes with full realization that an extensive period of development was ahead before the gas turbine locomotive would become a commercial product.

Built in one unit arranged for single end operation, the locomotive is carried on four two-axle swivel trucks having all eight axles equipped with traction motors, making all of the weight available for adhesion. The main supply is secured from two 2000 hp open-cycle gas turbine generator sets, located side by side in the locomotive cab with a center aisle. Steam for train heating purposes is provided by two boilers, having a total steam producing capacity of 5000 lb per hour. The locomotive was completed in April, 1950, and placed in road operation in May, burning distillate and residual fuel oil. Results show that selected grades of heavy oil can be used successfully.

Major dimension, weights and ratings of the locomotives are presented below. As a ready guide for evaluating the dimensions of this locomotive, similar figures are given for a conventional diesel passenger locomotive of comparable capacity. In general terms, the gas turbine locomotive has approximately two-thirds of the weight and one-half of the length of the diesel.

LOCOMOTIVE CHARACTERISTICS

	Baldwin Westinghouse Gas Turbine	*Typical Diesel*	*Alco-GE Gas Turbine*
Wheel Arrangement	B-B-B-B	2(A1A-A1A)	B-B-B-B
Length Over-all	77'10"	142'7"	83'6 ½"
Width	10'0 ¾"	10'7"	10'7"
Height	14' 1"	14'1"	14'5 ½"
Rigid Wheel Base	9' 0"	14'1"	9'4"
Total Wheel Base	62' 9"	127'0"	68'1"
Wheel Diameter	42"	42"	42"
Total Locomotive Weight, lb	460,000	650,000	520,000
Weight on Drivers, lb	460,000	450,000	520,000
Weight Per Driving Axle, lb	57,500	56,250	65,000
Rated Horsepower	4000	4000	4500
Starting Tractive Effort, 25% Adhesion, lb	115,000	112,500	125,000
Continuous Tractive Effort, lb	52,800	52,800	100,000
Maximum Speed, mph	100	100	69.3

Conclusion

The value of the coal-fired gas turbine to American railroads lies not only in that it will be able to operate cheaper than the diesel, because of the lower price of coal, but of far greater importance is the fact that coal is the one fuel which is virtually inexhaustible, while the United States is already dependent in part upon imported oil.

Metal and Nonmetallic Mineral Mining Men Meet October 22-24 to Consider Industry Role in Defense Effort

TRUE to the traditions of southern California hospitality, the mining men of Los Angeles headed by Harvey S. Mudd, chairman, Western Division AMC, and their ladies have gone all out to make the 1951 Metal and Nonmetallic Mineral Mining Convention an event that will occupy a prominent place in the history of American Mining Congress conventions.

Preparations for the operating and economic side of the program have been completed under the guidance of National Program Committee Chairman Ross Leisk, General Manager, Sunshine Mining Co., of Kellogg, Idaho. Topics to be discussed have been grouped into five general and four operating sessions, in addition to six special conferences.

The final program is studded with the names of such speakers of national and international importance as Lewis W. Douglas, former Ambassador to Great Britain; Assistant Secretary of War Karl R. Bendetsen; Defense Materials Procurement Administrator Jess Larson; Deputy Administrator Howard I. Young, President of the American Zinc, Lead and Smelting Co., Hon. Thomas E. Martin, Representative from Iowa; Dr. James Boyd, Director of the U. S. Bureau of Mines; Director William E. Wrather of the U. S. Geological Survey; Brig. Gen. A. Robert Ginsburgh, Defense Department; Tom Lyon, C. O. Mittendorf and many other noted men from government and industry. These leaders will deal with the subjects of industrial mobilization, the defense minerals program, mining development and

★ State Chairmen ★

ROSS D. LEISK
National Chairman
Program Committee

GUY N. BJORGE
South Dakota

R. D. BRADFORD
Utah

J. H. BUCHANAN
Tri-State

BLAIR BURWELL
Colorado

T. M. CRAMER
New Mexico

ROY B. EARLING
Alaska

WESLEY P. GOSS
Arizona

J. C. KINNEAR, JR.
Nevada

CHAS. A. R. LAMBLY
Washington

GROVER E. LeVEQUE
Lake Superior

F. W. LIBBEY
Oregon

D. H. McLAUGHLIN
California

R. J. MECHIN
Eastern States

J. B. PERRY
Wyoming

JOHN T. RYAN, JR.
Manufacturers

R. B. SHELLEDY
Montana

GEORGE F. ZOFFMAN
Texas

expansion programs, manpower and labor relations, taxation, public lands, etc. In the special conferences gold and monetary problems, taxation, strategic minerals and uranium mining will be up for detailed discussion.

The sessions devoted to operating problems will bring together mining men from every corner of this country as well as from Canada and foreign parts, to tell how they conquered the problems that have confronted them—or to learn how others have overcome the obstacles interrupting the smooth flow of metals and minerals into the channels of our economy. In the course of these sessions milling progress, rock drilling, shaft sinking and mechanization of underground and surface mining will be thoroughly discussed. Special conferences on rock bolting and on roasting and sulphur recovery have been arranged in order to bring these vital and up-to-the-minute subjects to the attention of interested mining men. The full program is given on pages 46-47 and 50.

Resolution Committee Acts

Under the leadership of Donald A. Callahan of Wallace, Idaho, Vice-President of the American Mining Congress, a 31-man Resolutions Committee will draft a Declaration of Policy to set forth the views of the entire mining industry on national policies affecting the

WESTERN DIVISION

THE AMERICAN CONGRESS

HARVEY S. MUDD, Chairman
President
Cyprus Mines Corp.

•

BOARD OF GOVERNORS

J. EDWARD BERG, Gen. Mgr., Federal Mining & Smelting Co.

O. W. BILHARZ, Pres., Bilharz Mining Co.

GUY N. BJORGE, Vice Pres. & Gen. Mgr., Homestake Mining Co.

P. R. BRADLEY, JR., Alaska Juneau Gold Mining Co.

WORTHEN BRADLEY, Pres., Bradley Mining Co.

FAY I. BRISTOL, Pres., Bristol Silica Co.

WM. C. BROWNING, Western Repr., Gold Fields American Development Co.

J. H. BUCHANAN, Pres., Nellie B. Mining Co.

BLAIR BURWELL, Mgr., Climax Uranium Co.

G. F. COOPE, Pres., Potash Co. of America.

J. J. CURZON, Mgr., Chelan Div., Howe Sound Co.

KUNO DOERR, JR., Mgr., East Helena Plant, American Smelting & Refining Co.

ROY B. EARLING, Vice Pres. & Gen. Mgr. of Oprs., Fairbanks Dept., U. S. Smelting Refining & Mining Co.

CARL S. ELAYER, Silver City, N. Mex.

E. F. GOODNER, Pres., American Gilsonite Co.

N. P. GOODRICH, Acting Mgr., Bald Mountain Mining Co.

WILLIAM H. GOODRICH, Gen. Mgr., Chino Mines Div., Kennecott Copper Corp.

WESLEY P. GOSS, Vice Pres. & Gen. Mgr., Magma Copper Co.

JOHN D. HAMM, Pres., Crystal Hill Mining Co.

ROY A. HARDY, Cons. Eng. in Chg., Getchell Mine, Inc.

WALTER M. HORNE, Acting Mgr., Utah Mining Assn.

ELMER ISERN, Pres., Eagle-Picher Mining & Smelting Co.

J. C. KINNEAR, JR., Gen. Mgr., Nevada Mines Div., Kennecott Copper Corp.

CHARLES R. KUZELL, Asst. Gen. Mgr., Phelps Dodge Corp.

F. W. LIBBEY, Dir., Oregon State Dept. of Geol. & Mineral Industries.

E. S. McGLONE, Vice Pres., Anaconda Copper Mining Co.

FRANK N. MARR, Pres., Spokane-Idaho Mining Co.

HARRY W. MARSH, Secy., Idaho Mining Assn.

ROBERT S. PALMER, Exec. Dir., Colorado Mining Assn.

D. J. POPE, Mgr., Mining Dept., American Smelting & Refining Co.

HENRY M. RIVES, Secy. & Treas., Nevada Mine Operators Assn.

A. H. SHOEMAKER, Gen. Mgr., Triumph Mining Co.

E. McL. TITTMAN, Mgr., Southwestern Dept., American Smelting & Refining Co.

CARL J. TRAUERMAN, Secy. & Treas., Mining Association of Montana.

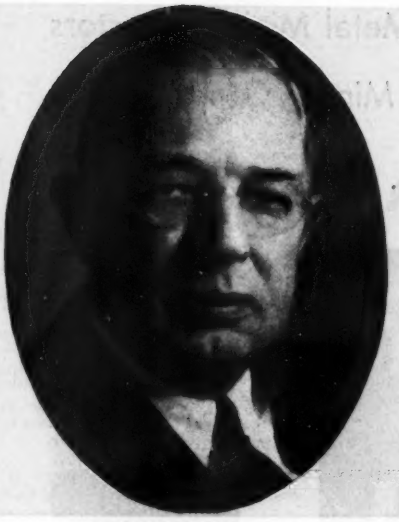
H. E. TREICHLER, Vice Pres. & Gen. Mgr., Texas Gulf Sulphur Co.

F. C. van DEINSE, Vice Pres. & Gen. Mgr., Yuba Consolidated Gold Fields.

CHARLES F. WILLIS, State Secy., Arizona Small Mine Operators Assn.

S. H. WILLISTON, Vice Pres., Cordero Mining Co.

RICHARD A. YOUNG, Vice Pres., American Zinc Co. of Illinois.



HARVEY S. MUDD
Chairman
Western Division

General Chairman

Arrangements Committee

GENERAL COMMITTEE

PETER COLEFAX
Vice Chairman

N. K. ANDERSON
Vice Chairman

BLAIR W. STEWART
Secretary

TRIPS

HENRY MULRYAN
Chairman

G. A. BECKETT
Vice Chairman

R. B. COONS
Vice Chairman

LADIES

MRS. H. J. CLARK
Chairman

WELCOMING

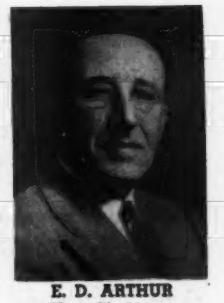
WM. C. BROWNING
Chairman

PUBLICITY

JOSEPH A. HARTLEY
Chairman

MRS. H. P. GOWER
Vice Chairman

VICTOR J. HAYEK
Vice Chairman



E. D. ARTHUR
Vice Chairman

production of metals and minerals. The resolutions making up this Declaration of Policy will then be presented at appropriate points during the various sessions for consideration by the entire Convention. Experience has shown that this procedure ensures full attention to these important questions of industrial policy and facilitates adequate coverage by the press.

Entertainment Plans Set

The serious business which is the basis of the Convention will be supplemented by periods of relaxation and fun. Accordingly, time has been allowed for the gala events for which these meetings are justly noted. The Welcome Luncheon at noon on Monday will be the setting for a warm welcome to California and an off-the-record talk by Lewis W. Douglas. Monday evening the Biltmore Bowl will be the scene of a dinner-dance where conventioneers will be able to hear and see some of the best entertainment on the West Coast and dance to the music of a top-flight band. On Wednesday evening, all will want to attend the Annual "Speechless" Ban-

President and Metal Mining Directors

American Mining Congress

HOWARD I. YOUNG
President

(Not Shown)
NEIL W. RICE

A. E. BENDELARI

WORTHEN BRADLEY

D. A. CALLAHAN

LOUIS S. CATES

ANDREW FLETCHER

V. P. GEFFINE

W. H. HOOVER

H. C. JACKSON

J. C. KINNEAR

MERRILL E. SHOUP

quet to be held in the Cocoanut Grove and Embassy Room of the Ambassador Hotel. This social event in unrivaled surroundings will be the climax of the Convention and the mining year.

Tuesday evening has been left free for the informal get-togethers and visiting among friends that are a feature of all AMC conventions. It should be noted here that the San Francisco Opera Co. opens its fifteenth Los Angeles season on this night presenting "La Traviata" with Lily Pons and Jan Peerce.

Ladies' Events Planned

As is usual, special events have been arranged for the lady convention-visitors, who are of course welcome also at all other functions. On Tuesday afternoon a sight-seeing tour of movieland will include visits to the homes of the stars and the famous Sunset Strip. The tour will be followed by a reception and tea at the home of Mr. and Mrs.

PROGRAM Committee

ALASKA

CHARLES F. HERBERT
Yukon Placer Mining Co.

CHARLES J. JOHNSTON
Goodnews Bay Mining Co.

ERNEST N. PATTY
Alluvial Golds, Inc.

J. A. WILLIAMS
Alaska Juneau Gold Mining Co.

ARIZONA

T. G. CHAPMAN
College of Mines, University of Arizona

ERNEST R. DICKIE
Bagdad Copper Corp.

GROVER J. DUFF
Eagle-Picher Mining & Smelting Co.

P. D. I. HONEYMAN
Inspiration Consolidated Copper Co.

ROBERT W. HUGHES
Miami Copper Co.

CHARLES R. KUZELL
Phelps Dodge Corp.

R. I. C. MANNING
Arizona Dept. of Mineral Resources

H. F. MILLS
Shattuck-Denn Mining Corp.

A. P. MORRIS
Kennecott Copper Corp.

F. V. RICHARD
American Smelting & Refining Co.

JOHN R. RICHARDS
St. Anthony Mining & Development Co., Ltd.

W. R. STORMS
U. S. Bureau of Mines

CHARLES F. WILLIS
Arizona Small Mine Operators Assn.

CALIFORNIA

E. D. ARTHUR
Los Angeles Chamber of Commerce

B. C. AUSTIN
San Francisco

GRANVILLE S. BORDEN
San Francisco

P. R. BRADLEY, JR.
Pacific Mining Co.

WORTHEN BRADLEY
Bradley Mining Co.

WALTER LYMAN BROWN
Knob Hill Mines, Inc.

WILLIAM C. BROWNING
Western Repr. Gold Fields American Development Co.

JAMES L. BRUCE
Cyprus Mines Corp.

GEORGE D. DUB
Cyprus Mines Corp.

GORDON I. GOULD
Gordon I. Gould & Co.

CLAUDE G. GRIM
Pacific Coast Borax Co.

VICTOR J. HAYEK
Mining Association of the Southwest

IRA B. JORALEMON
San Francisco

ESTEY A. JULIAN
Goldfield Consolidated Mines Co.

L. T. KETT
Mountain Copper Co., Ltd.

ALBERT F. KNORP
California Chapter, A.M.C.

JOHN C. LOKKEN
Dow Chemical Co.

H. S. LORD
Dragline Gold Producers of California

WM. WALLACE MEIN, JR.
Calaveras Cement Co.

CHARLES W. MERRILL
The Merrill Co.

HENRY T. MUDD
Los Angeles

HENRY MULRYAN
Sierra Talc & Clay Co.

KENNETH B. POWELL
Kaiser Steel Corp.

W. S. REID
American Smelting & Refining Co.

H. A. SAWIN
Yuba Consolidated Gold Fields

ROBERT M. SEARLS
San Francisco

R. G. SMITH
Natomas Co.

EDWARD WISSER
Berkeley

COLORADO

C. J. ABRAMS
Climax Molybdenum Co.

MAX W. BOWEN
Golden Cycle Corp.

C. E. COLLINS
U. S. Atomic Energy Commission

WILLIAM J. COULTER
Climax Molybdenum Co.

E. J. DUGGAN
Climax Uranium Co.

J. H. EAST, JR.
U. S. Bureau of Mines

J. PAUL HARRISON
American Smelting & Refining Co.

JOHN W. HILL
U. S. Vanadium Corp.

FRANK H. MacPHERSON
U. S. Atomic Energy Commission

V. L. MATSON
Colorado School of Mines

ROBERT S. PALMER
Colorado Mining Assn.

C. J. PARKER, JR.
Telluride Mines

GEORGE H. RUPP
Colorado Fuel & Iron Corp.

D. W. VILES
Vanadium Corp. of America

IDAHO

HAROLD D. BAILEY
Bradley Mining Co.

MALCOLM C. BROWN
Sidney Mining Co.

EDWARD B. DOUGLAS
Calera Mining Co.

JOHN EDGAR
Sunshine Mining Co.

ROLLIN D. FARMIN
Day Mines, Inc.

ROY S. HOOPER
Bunker Hill & Sullivan Mining & Concentrating Co.

J. C. KIEFFER
Spokane-Idaho Mining Co.

L. J. RANDALL
Hecla Mining Co.

HARRY W. MARSH
Idaho Mining Assn.

A. H. SHOEMAKER
Triumph Mining Co.

NORMAN M. SMITH
Clayton Silver Mines

MONTANA

W. R. ALLEN
Bostana Mines Co.

A. C. BIGLEY
Anaconda Copper Mining Co.

LESTER BISHOP
Anaconda Copper Mining Co.

E. R. BORCHERDT
Anaconda Copper Mining Co.

FRED BURNETT
Montana Phosphate Products Co.

R. B. CAPLES
Anaconda Copper Mining Co.

HUGH L. CONNER
Ideal Cement Co.

CLARENCE G. DERICK
Victor Chemical Works

KUNO DOERR, JR.
American Smelting & Refining Co.

M. H. GIDEL
Anaconda Copper Mining Co.

R. H. GLOVER
Anaconda Copper Mining Co.

A. E. HAESELER
Mike Horse Mining & Milling Co.

F. A. LINFORTH
Anaconda Copper Mining Co.

L. B. MANNING
Trout Mine

A. B. MARTIN
Montana Power Co.

E. S. McGLONE
Anaconda Copper Mining Co.

W. E. MITCHELL
Anaconda Copper Mining Co.

J. B. MYERS
Zonolite Co.

ROBERT P. PORTER
Porter Bros. Corp.

E. I. RENOUARD
Anaconda Copper Mining Co.

JOSEPH T. ROY
American Smelting & Refining Co.

R. H. SALES
Anaconda Copper Mining Co.

I. E. SERIGSTAD
North Butte Mining Co.

CHESTER H. STEELE
Anaconda Copper Mining Co.

A. V. TAYLOR, JR.
Taylor-Knapp Co.

CARL J. TRAUERMAN
Mining Assn. of Montana

DR. J. R. VAN PELT
Montana School of Mines

PROGRAM Committee

(Continued)

NEVADA

S. S. ARENTZ
Combined Metals Reduction Co.

A. A. BAKEWELL, JR.
Kennecott Copper Corp.

H. D. BUDELMAN
Tonopah

PERCY G. DOBSON
Summit King Mines, Ltd.

V. P. GIANELLA
Mackay School of Mines, University of Nevada

ROY A. HARDY
Getchell Mine, Inc.

A. C. JOHNSON
U. S. Bureau of Mines

GEORGE W. MITCHELL
Eureka Corp., Ltd.

A. J. O'CONNOR
Consolidated Coppermines Corp.

HENRY M. RIVES
Nevada Mine Operators Assn.

NEW MEXICO

E. S. BOWMAN
Banner Mining Co.

G. F. COOPE
Potash Co. of America

L. H. DURIEZ
U. S. Smelting Refining & Mining Co.

C. S. ELAYER
Elayer & Co.

WILLIAM H. GOODRICH
Kennecott Copper Corp.

G. T. HARLEY
International Minerals & Chemical Corp.

VINCENT C. KELLEY
University of New Mexico

H. E. McCRAY
Burro Chief Mines

D. H. PLACKARD
New Mexico Miners & Prospectors Assn.

T. A. SNEDDEN
American Smelting & Refining Co.

JOSEPH H. TAYLOR
Peru Mining Co.

GEO. A. WARNER
Zuni Milling Co.

IRA L. WRIGHT
Black Hawk Consolidated Mines Co.

OREGON

FAY I. BRISTOL
Bristol Silica Co.

PIERRE R. HINES
Portland

D. FORD McCORMICK
Eagle Point

ERNEST A. MESSER
Messer, Toye & Associates

S. H. WILLISTON
Cordero Mining Co.

SOUTH DAKOTA

ALBRO C. AYRES
Black Hills Mining Assn.

N. P. GOODRICH
Bald Mountain Mining Co.

KENNETH C. KELLAR
Kellar & Kellar & Driscoll

L. E. SHAFFER
South Dakota School of Mines

TEXAS

E. B. GERMANY
Lone Star Steel Co.

EUGENE M. THOMAS
Texas Western College

H. E. TREICHLER
Texas Gulf Sulphur Co.

RICHARD A. YOUNG
American Zinc Co. of Illinois

UTAH

BURT B. BREWSTER
Mining & Contracting Review

LOUIS BUCHMAN
Kennecott Copper Corp.

W. H. H. CRANMER
New Park Mining Co.

J. P. CAULFIELD
Kennecott Copper Corp.

CECIL A. FITCH, JR.
Chief Consolidated Mining Co.

E. F. GOODNER
American Gilsonite Co.

JAMES E. HOGLE
Rico Argentine Mining Co.

WALTER M. HORNE
Utah Mining Assn.

P. H. HUNT
Park Utah Consolidated Mines Co.

DR. WALTHER MATHESIUS
Geneva Steel Co.

H. BYRON MOCK
Bureau of Land Management

W. C. PAGE
U. S. Smelting Refining & Mining Co.

MILTON D. PAINE
Tintic Standard Mining Co.

DR. P. J. SHENON
Dept. of Mining, University of Utah

E. H. SNYDER
Combined Metals Reduction Co.

F. A. WARDLAW, JR.
International Smelting & Refining Co.

KEITH WHITING
American Smelting & Refining Co.

STUART R. ZIMMERLEY
U. S. Bureau of Mines

WASHINGTON

DAVID H. BEETEM
Aluminum Co. of America

HOWARD F. CAMERON
Northwest Mining Assn.

J. J. CURZON
Howe Sound Co.

FRANCIS FRINK
Washington Iron Works

A. B. GRENINGER
General Electric Co.

L. M. KINNEY
Pend Oreille Mines & Metals Co.

E. R. MARBLE
American Smelting & Refining Co.

DRURY A. PIFER
School of Mineral Engineering, University of Washington

E. C. STEPHENS
Anaconda Copper Mining Co.

LEWIE WILLIAMS
West Coast Mineral Assn.

WYOMING

RALPH S. BLITZ
Riverton

MAXWELL STRUTHERS BURT
Moran

BAHNGRELL W. BROWN
Omaha

WALTER E. DUNCAN
University of Wyoming

WALTER D. FINNEGAN
U. S. Bureau of Mines

HENRY G. FISH
Natural Resources Research Institute, University of Wyoming

A. C. HARDING
Black Hills Bentonite, Inc.

H. C. LIVINGSTON
Union Pacific Coal Co.

E. R. LUND
White Horse Mining Co.

R. J. PENROSE
National Lead Co.

C. O. STEPHENS
Texas Gulf Sulphur Co.

TRI-STATE AND MISSISSIPPI VALLEY

O. W. BILHARZ
Bilharz Mining Co.

ELMER ISERN
Eagle-Picher Mining & Smelting Co.

HAROLD A. KRUEGER
National Lead Co.

E. R. LOVELL
Calumet & Hecla Consolidated Copper Co.

M. H. LOVEMAN
Tri-State Zinc, Inc.

GEORGE W. POTTER
Potter-Sims Mining Co.

J. H. STEINMESCH
Minerva Oil Co.

H. G. WEIDMAN
Weidman Mining Co.

LAKE SUPERIOR DISTRICT

ALEX D. CHISHOLM
Pickands Mather & Co.

R. T. ELSTAD
Oliver Iron Mining Co.

HUGH H. HARRISON
Pacific Isle Mining Co.

M. D. HARBAUGH
Lake Superior Iron Ore Assn.

C. C. HENNING
Jones & Laughlin Steel Corp.

GROVER J. HOLT
Cleveland-Cliffs Iron Co.

T. L. JOSEPH
Minnesota School of Mines & Metallurgy, University of Minnesota

W. S. MOORE
W. S. Moore Co.

W. L. MAXSON
Oliver Iron Mining Co.

C. W. NICOLSON
North Range Mining Co.

RAY D. NOLAN
Department of Conservation, Minnesota

J. MURRAY RIDDELL
Michigan College of Mining & Technology

O. A. SUNDNESS
Snyder Mining Co.

L. J. SEVERSON
Oliver Iron Mining Co.

F. J. SMITH
Oglebay Norton & Co.

DAVID N. SKILLINGS
Duluth

J. WILBUR VAN EVERA
Crosby

R. W. WHITNEY
M. A. Hanna Co.

EASTERN STATES

FRANK A. AYER
Copper Range Co.

ARTHUR P. CORTELYOU
U. S. Vanadium Corp.

JULIAN W. FEISS
Defense Minerals Administration

ERNEST V. GENT
American Zinc Institute, Inc.

R. F. GOODWIN
American Smelting & Refining Co.

SIDNEY S. GOODWIN
New Jersey Zinc Co.

IRA K. HEARN
Quebec Iron & Titanium Corp.

EVAN JUST
Engineering & Mining Journal

WM. J. LINNEY
Republic Steel Corp.

PLATO MALOZEMOFF
Newmont Mining Corp.

FRANK R. MILLIKEN
National Lead Co.

T. A. MITCHELL
Tennessee Copper Co.

F. S. MULOCK
U. S. Smelting, Refining & Mining Co.

R. S. NEWLIN
Anaconda Copper Mining Co.

ROBERT L. ZIEGFELD
Lead Industries Assn.

MINING EQUIPMENT MANUFACTURERS

D. C. CARD
C. S. Card Iron Works Co.

L. A. DOAN
Dow Chemical Co.

GEO. B. DONER
Chicago Pneumatic Tool Co.

F. S. ELFRED
Western Cartridge Co.

J. H. FULFORD
Jeffrey Manufacturing Co.

WILLIAM E. GOODMAN
Goodman Manufacturing Co.

JOHN GRAHAM
American Steel & Wire Co.

C. W. HAGENBUCH
Sheffield Steel Corp.

E. M. HEUSTON
Bucyrus-Erie Co.

H. N. HOW
Western Machinery Co.

R. U. JACKSON
Hewitt-Robins Incorporated

L. KEANE
Hercules Powder Co.

HARVEY MATHEWS
Stearns-Roger Manufacturing Co.

R. W. PERSONS
Crucible Steel Co. of America

E. M. PLATTS
Joy Manufacturing Co.

C. H. RIEMAN
Gardner-Denver Co.

CHARLES B. STAINBACK
Westinghouse Electric Corp.

J. M. WELDON
International Nickel Co.

Harvey S. Mudd in Beverly Hills. Wednesday the Crystal Room of the Beverly Hills Hotel will be the stage for a luncheon and fashion show. In these beautiful surroundings the latest fall styles will be shown by I. Magnin of Beverly. In addition to these planned events the ladies of Los Angeles have arranged for an Information Center at Ladies' Headquarters in the Biltmore Hotel, where there will be someone on hand to advise visitors where to go, and what to see and do in Los Angeles and vicinity, during their stay in this beautiful city.

Trips Round Out Week

On Thursday and Friday, following the close of the regular business sessions, a choice of four interesting trips is offered to Convention-goers. Two trips have been scheduled for each day, offering a fine opportunity to see some of the scenic and industrial attractions that make this rapidly growing city famous.

On Thursday morning a bus will take those who elect to go on the first of these trips, through the suburbs of Los Angeles and miles of citrus groves to the Riverside Cement Co.'s operations at Crestmore. Here the men will inspect the surface plants and underground operation where limestone is mined for cement production by a unique block caving method. Meanwhile the ladies will proceed to Riverside to enjoy a tour of the world-famous Mission Inn. Here the party will be reunited at lunch, following which the return trip will take them through the Kaiser Steel Plant at Fontana and the Irwindale Plant and Mine of Consolidated Rock Products Co. at Azusa. At the latter, 1000 tons per hour is conveyed from the highly mechanized mine to the ultra-modern mill and passed on to stockpiles, truck and railroad cars in the form of finished, sized concrete aggregate.

On Thursday morning also, another group will leave by bus for the airport to start on an air trip over the huge metropolitan area of Los Angeles, the mountains which surround it and its inland desert areas where they will pass over the famous Palm Springs desert resort. From the air will be seen the major hydro-electric projects, Parker, Davis and Hoover dams. The plane will land at the latter to allow the party to see the enormous turbines which harness the Colorado River, turning its energy into electric power for the City of Los Angeles and the rapidly growing industrial areas of the southwest. Following lunch, the return flight will pass over Death Valley, which was the trouble spot for many Forty-niners who sought a short route to California's mines.

On Friday morning another air-bus tour will start an all-day trip to the Naval Ordnance Test Station at Inyokern, California and the Searls Lake deposits and processing plant of the American Potash and Chemical Corp. at Trona. After flying over a part of the Mojave Desert the plane will land at the Inyokern base. Naval officials will escort the visitors through the main points of interest on the reservation, where research and development work on propulsion, fire control and guidance systems for

(*Continued on page 51*)

Program

Monday, October 22

8:30 a.m. REGISTRATION—Galeria

9:45 a.m. PRE-SESSION MOTION PICTURE

10:15 a.m. INDUSTRIAL MOBILIZATION

Chairman: Ross D. Leisk, *Gen. Mgr.*, Sunshine Mining Co.

The Defense Program—Its Dependence on Raw Materials.
Hon. Karl R. Bendetsen, *Assistant Secretary of the Army*

What's Wrong With Our Raw Materials Supply
Hon. Thos. E. Martin, *Member of Congress from Iowa*

National Mineral Policies
James Boyd, *Retiring Director, U. S. Bureau of Mines*

Reports of Resolutions Committee: General Policy (with particular reference to the mining industry and national defense)—Gold and Monetary Policy.

12:15 p.m. WELCOMING LUNCHEON. Biltmore Bowl.

Presiding: Harvey S. Mudd, Los Angeles; Chairman, Western Division, A.M.C., and General Chairman, Arrangements Committees

Welcome to California:
Hon. Goodwin Knight, *Lieutenant Governor of the State of California*

Responses: Howard I. Young, *Pres.*, American Zinc, Lead & Smelting Co.; President, American Mining Congress.
Ross D. Leisk, *Gen. Mgr.*, Sunshine Mining Co.; National Chairman, Program Committee.
John T. Ryan, Jr., *Exec. Vice-Pres.*, Mine Safety Appliances Co.; Chairman, Manufacturers Division, A.M.C.

Introduction of State Chairmen Program Committee

Introduction of Chairmen and Vice-Chairmen of Los Angeles Committees

Address: Hon. Lewis W. Douglas

2:00 p.m. PRE-SESSION MOTION PICTURE

2:30 p.m. DEFENSE MINERALS PROGRAM

Chairman: Howard I. Young, *Pres.*, American Zinc, Lead & Smelting Co.

Status of the Defense Minerals Program
Jess Larson, *Administrator*, Defense Materials Procurement Agency
Tom Lyon, *Defense Materials Procurement Agency*
C. O. Mittendorf, *Acting Administrator*, Defense Minerals Administration
William E. Wrather, *Director*, U. S. Geological Survey
Harold A. Montag, *Director*, Mining Machinery Division, National Production Authority

Industry Discussion and Questions
Roy A. Hardy, *Consulting Engr. in Charge*, Getchell Mine, Inc.
E. H. Snyder, *Pres.*, Combined Metals Reduction Co.
P. R. Bradley, Jr., *Pres.*, Pacific Mining Co.
Frank A. Ayer, *Vice-Pres.*, Copper Range Co.
Harrie S. Taylor, *Pres.*, Oglebay Norton & Co.
Robert G. Page, *Pres.*, Phelps Dodge Corp.
Joseph H. Taylor, *Vice-Pres.*, Peru Mining Co.
J. B. Haffner, *Gen. Mgr.*, Bunker Hill & Sullivan Mining & Concentrating Co.

2:10 p.m. PRE-SESSION MOTION PICTURE

2:30 p.m. MILLING PROGRESS

Chairman: E. H. Rose, *Research Engr.*, Tennessee Coal, Iron & R.R. Co.

Innovations in Processing Tungsten Ores
Chas. H. Segerstrom, Jr., *Pres.*, Nevada-Massachusetts Co.

Heavy Media Separation of Northern Alabama Iron Ores
J. B. Baker, *Mgr.*, Schroeder Co.

The Centriclone Classifier
Kellogg Krebs, *Metallurgical Consultant*, San Francisco

7:30 p.m. DINNER DANCE. Biltmore Bowl

Tuesday, October 23

8:30 a.m. REGISTRATION—Galeria

9:00 a.m. PRE-SESSION MOTION PICTURE

9:30 a.m. MINING DEVELOPMENT AND EXPANSION

Chairman: Evan Just, *Editor, Engineering & Mining Journal*

What the Future Holds for the Metals and Minerals
Dr. Joseph Zimmerman, *Editor-in-Chief, Daily Metal Reporter*

Defense Trends
Brig. Gen. A. Robert Ginsburgh, Department of Defense

Expanding Our Mineral Supplies
A symposium led by the chairman; including, among others, reports on development and expansion programs in the following branches of the industry:

Copper: Speaker to be announced

Lead-Zinc: Otto Herres, *Vice-Pres.*, Combined Metals Reduction Co.

Aluminum-Magnesium: Lawrence Litchfield, Jr., *Vice-Pres.*, Alcoa Mining Co.

Iron Ore: R. T. Elstad, *Pres.*, Oliver Iron Mining Co.

Sulphur: Z. W. Bartlett, *Assistant Gen. Mgr.*, Freeport Sulphur Co.

Tungsten, Mercury, Chromium, Uranium: Ira B. Joralemon, *Consulting Engr.*, San Francisco

LEWIS DOUGLAS

KARL R. BENDETSEN

JESS LARSON

HON. THOS. MARTIN

NATHAN FEINSINGER

JAMES BOYD

A. ROBT. GINSBURGH
Brig. Gen. U.S.A.

STEPHEN WOOD

W. E. WRATHER

HAROLD MONTAG

Titanium: GLOYD M. WILES, *Mgr.*, Mining Dept., National Lead Co.

Manganese: F. A. LINFORTH, *Assistant to Vice-Pres.* Anaconda Copper Mining Co.

Potash, Phosphate Rock, Cement, Fluorspar, Molybdenum, Antimony, Cobalt, Mica, Barite, Graphite, etc.: EVAN JUST, *Editor, Engineering & Mining Journal*

Report of Resolutions Committee: Mining Development and Expansion (including Government minerals programs, stockpiling, tariffs, etc.)

●

9:10 a.m. PRE-SESSION MOTION PICTURE

9:30 a.m. ROCK DRILLING

Chairman: GUY N. BJORGE, *Vice Pres. & Gen. Mgr.*, Homestake Mining Co.

Economic Limit of Lightweight Drilling Equipment
A. J. ZINKL, *Assistant Supt.*, Iron King Mine, Shattuck-Denn Mining Co.

Bit Experience in Hard Rock Drilling
E. M. HOLMES, *Assistant Supt.*, Oliver Iron Mining Co.

Experience With Lightweight Air-Leg Drill
R. W. ADAMSON, *Mining Engr.*, Ingersoll-Rand Co.

●

1:30 p.m. PRE-SESSION MOTION PICTURE

2:00 p.m. MANPOWER—LABOR RELATIONS

Chairman: R. D. BRADFORD, *Gen. Mgr.*, Utah Dept., American Smelting & Refining Co.

Manpower for the Mines
STEPHEN W. WOOD, Manpower Branch, Defense Minerals Administration

The Wage Stabilization Policy
NATHAN P. FEINSINGER, *Chairman*, Wage Stabilization Board

Trend of Recent Contract Negotiations
LYMAN M. TONDEL, JR., *Member*, Cleary, Gottlieb, Friendly & Hamilton

Discussion: JAMES K. RICHARDSON, *Industrial Engr.*, Kennecott Copper Corp.

Reports of Resolutions Committee:
Manpower and Labor Relations
Social Security—Definition of employe

●

1:40 p.m. PRE-SESSION MOTION PICTURE

2:00 p.m. SHAFT SINKING

Chairman: GEORGE T. HARLEY, *Mgr.*, Potash Operations, International Minerals & Chemical Corp.

Freezing of Quicksand Employed in Sinking PCA Shaft
RUSSELL G. HAWORTH, *Resident Mgr.*, Potash Co. of America

Water Problems in Shaft Sinking at Friedensville
FRED D. WRIGHT, *Senior Mining Engr.*, U. S. Bureau of Mines,
R. L. LOOFBOUROW, *Mgr.*, E. J. Longyear Co., and FRANK J. KANE, *Supt.*, E. J. Longyear Co.

Concreting the Kelley Shaft
ANDREW SIMS, *Assistant Gen. Supt.*, and LESTER F. BISHOP, *Assistant Research Engr.*, Anaconda Copper Mining Co.

South African Shaft Sinking Methods
GORDON S. DE VILLIERS, Orange Free State Gold Mining Co.

Remarks on Shaft Sinking at San Manuel
J. F. BUCHANAN, *Mine Supt.*, Magma Copper Co.

●

EVENING—OPEN (No scheduled entertainment)

Wednesday, October 24

8:30 a.m. REGISTRATION—Galeria

9:00 a.m. PRE-SESSION MOTION PICTURE

9:30 a.m. PUBLIC LANDS TAXATION

Co-Chairmen: PAUL B. JESSUP, *Vice-Pres.*, Day Mines, Inc, and HENRY B. FERNALD, Loomis, Suffern & Fernald, *Chairman*, American Mining Congress Tax Committee

(*Continued on page* 50)

JOHN T. RYAN, JR.
Executive Vice-President
Mine Safety Appliances Co.
Chairman

Manufacturers Division

Allen-Sherman-Hoff Pump Co.
*Allis-Chalmers Mfg. Co.
Allis Co., Louis
Alloy Steel & Metals Co.
American Air Filter Co., Inc.
*American Brake Shoe Co.
American Brattice Cloth Corp.
*American Car & Foundry Co.
American Chain & Cable Co.
*American Cyanamid Co., Explosives Dept.
American Mine Door Co.
Anaconda Wire & Cable Co.
Armstrong Coalbreak Co.
*Atlas Powder Co.

Baker-Raulang Co.
Barber-Greene Co.
Bearing Service Co. of Pittsburgh
Bird Machine Co.
Bixby-Zimmer Engineering Co.
Bowdil Co.
Broderick & Bascom Rope Co.
*Brown-Fayro Co.
Bucyrus-Erie Co.

Cambridge Machine & Supply Co.
Carboloy Co., Inc.
Card Iron Works Co., C. S.
Cardox Corp.
Caterpillar Tractor Co.
*Central Frog & Switch Co.
Central Mine Equipment Co.
Centrifugal & Mechanical Industries, Inc.
Chicago Pneumatic Tool Co.
Cincinnati Mine Machinery Co.
Cities Service Oil Co.
Clarkson Mfg. Co.
Cleveland Worm & Gear Co.
Coal Mine Equipment Sales Co.
Colorado Iron Works Co.
Continental Gin Co., Industrial Div.
Cross Engineering Co.
Crucible Steel Co. of America

D-A Lubricant Co., Inc.
Deister Concentrator Co.
Deister Machine Co.
Differential Steel Car Co.
Dings Magnetic Separator Co.
Dow Chemical Co., Great Western Div.
Duff-Norton Mfg. Co.
*Du Pont de Nemours & Co., Inc., E. I.

*Edison, Inc., Thomas A.
Eimco Corp.
Electric Controller & Mfg. Co.
Electric Steel Foundry Co.
Electric Storage Battery Co.
*Elreco Corp.
Ensign Electric & Mfg. Co.
*Enterprise Wheel & Car Corp.
Euclid Road Machinery Co.

Fairmont Machinery Co.
Farmers Engineering & Mfg. Co.
Firestone Tire & Rubber Co.
Firth Sterling Steel & Carbide Corp.
Flexible Steel Lacing Co.
Flocker & Co., John
Flood City Brass & Electric Co.

Gardner-Denver Co.
*General Electric Co.
*Goodman Mfg. Co.
Goodrich Co., B. F.
Goodyear Tire & Rubber Co.
Gorman-Rupp Co.
Gould-National Batteries, Inc.
Guyan Machinery Co.

Harnischfeger Corp.
Hawthorne, Inc., Herb J.
Helmick Foundry-Machine Co.
*Hendrick Mfg. Co.

* Charter Members.

Hendrix Mfg. Co., Inc.
Hercules Motors Corp.
*Hercules Powder Co.
Hewitt-Robins Incorporated
Heyl & Patterson, Inc.
*Hockensmith Corp.
*Holmes & Bros., Inc., Robert
*Hulburt Oil & Grease Co.
Humphreys Investment Co.

Independent Pneumatic Tool Co.
Ingersoll-Rand Co.
International Nickel Co., Inc.
Irwin Foundry & Mine Car Co.
*I-T-E Circuit Breaker Co.

*Jeffrey Mfg. Co.
Johnson-March Corp.
*Joy Mfg. Co.

Kanawha Mfg. Co.
Kansas City Structural Steel Co.
Kennametal Inc.
Kensington Steel Co.
Koehler Mfg. Co.

LaBour Co., Inc.
Lake Shore Engineering Co.
Lee-Norse Co.
Lee Rubber & Tire Corp., Republic Rubber Div.
LeRoi Co., Cleveland Division
*Leschen & Sons Rope Co., A.
LeTourneau, Inc., R. G.
*Link-Belt Co.
Long Super Mine Car Co.
Longyear Co., E. J.
Ludlow-Saylor Wire Co.

*McGraw-Hill Publishing Co.
McLanahan & Stone Corp.
*McNally-Pittsburg Mfg. Corp.
Mack Motor Truck Corp.
MacWhyte Co.
Marion Power Shovel Co.
Mechanization, Inc.
*Mine Safety Appliances Co.
Mine & Smelter Supply Co.
Mining Machine Parts, Inc.
Mosebach Electric & Supply Co.
Mott Core Drilling Co.
Murphy Diesel Co.
*Myers-Whaley Co., Inc.

National Electric Coil Co.
National Malleable & Steel Castings Co.
National Mine Service Co.
Nolan Co.
Nordberg Mfg. Co.

*Ohio Brass Co.
Ohio Carbon Co.
Ohio Oil Co.
Okonite Co., Hazard Ins. Wire Works Division
Oliver Iron & Steel Corp.
Osmose Wood Preserving Co. of America

Page Engineering Co.
Paris Mfg. Co.
Pattin Mfg. Co.
Penn Machine Co.
Peterson Filters & Engineering Co.
*Phillips Mine & Mill Supply Co.
Pioneer Engineering Works, Inc.
Pittsburgh Gear Co.
Pittsburgh Screw & Bolt Co.
Post-Glover Electric Co.
Precision Chain Co.
Productive Equipment Corp.
Prox Co., Frank

Quaker Rubber Corp.

Raybestos-Manhattan, Inc.
Reliance Electric & Engineering Co.
*Roberts & Schaefer Co.
Rock Bit Sales & Service Co.
*Roebling's Sons Co., John A., Wire Rope Division
Rome Cable Corp.

Safety First Supply Co.
Salem Tool Co.
Schroeder Brothers
Sheffield Steel Corp.
*Simplex Wire & Cable Co.
Simplicity Engineering Co.
*S K F Industries, Inc.
Southwestern Engineering Co.
Sprague & Henwood, Inc.
Stearns-Roger Mfg. Co.
Stephens-Adamson Mfg. Co.
Sterling Steel Casting Co.
Sun Oil Co.

Tamping Bag Co.
Templeton, Kenly & Co., Inc.
Texas Co.
*Timken Roller Bearing Co.
Tool Steel Gear & Pinion Co.
Tracy Co., Bertrand P.
Traylor Engineering & Mfg. Co.
*Tyler Co., W. S.

Ultra-Violet Products, Inc.
Union Iron Works
Union Wire Rope Corp.
*United Engineers & Constructors, Inc.
U. S. Rubber Co.
*U. S. Steel Co.

Victaulic Co. of America
Vulcan Iron Works Co.

Wedge Wire Corp.
*Weir Kilby Corp.
Western Cartridge Co.
Western Machinery Co.
Western Rock Bit Mfg. Co.
Western Precipitation Corp.
*Westinghouse Electric Corp.
West Steel Casting Co.
West Virginia Steel & Mfg. Co.
White Motor Co., Sterling Division
Worthington Pump & Machinery Corp.

Yara Engineering Corp., Interstate Equipment Division

PROGRAM (Continued from page 47)

Do the Mining Laws Impede Resource Development
A. O. BARTELL, *Managing Engr.*, Raw Materials Survey

Report of Resolutions Committee: Public Lands Policy

What the Future Holds Taxwise
ELLSWORTH C. ALVORD, Alvord & Alvord, Washington, D. C.; General Tax Counsel, American Mining Congress

The 1951 Revenue Act
HENRY B. FERNALD, Chairman, A. M. C. Tax Committee

Discussion: Taxes and the Mining Industry
HON. THOS. E. MARTIN, *Member of Congress from Iowa*
L. J. RANDALL, *Comptroller*, Hecla Mining Co.
S. H. WILLISTON, *Vice-Pres.*, Cordero Mining Co.
DONALD H. MCLAUGHLIN, *Pres.*, Homestake Mining Co.

Reports of Resolutions Committee:
Taxation and Government Expenditures
Final Report—Mine Financing, Government Reorganization, etc.

●

9:10 a.m. PRE-SESSION MOTION PICTURE

9:30 a.m. MECHANIZED MINING

Chairman: W. C. BROWNING, *Western Repr.*, Gold Fields American Development Co.

Large Scale Mechanical Mining of Gravel Deposits in Southern California
RONALD C. GRIFFIN, *Production Mgr.*, Consolidated Rock Products Co.

Heavy Duty Trucks on the Iron Ranges
R. W. WHITNEY, *Gen. Mgr. of Minnesota Mines*, M. A. Hanna Co.

Improvements in Blast-Hole Drilling at Open Pit Mines
R. W. BELL, *Assistant Supt.*, Erie Mining Co.

Mechanical Mining in Nonmetallic Mines
H. L. GARDNER, *Mine Engr.*, International Minerals & Chemical Corp.

●

12:00 noon LUNCHEON MEETING—BOARD OF GOVERNORS, WESTERN DIVISION, AMERICAN MINING CONGRESS

●

2:00 p.m. SPECIAL CONFERENCES
(Open to all persons interested)

ROCK BOLTING

Chairman: E. R. BORCHERDT, *Chief Research Engr.*, Anaconda Copper Mining Co.

Rock Bolting Experience at Butte
LLOYD POLLISH and ROBERT L. SANDVIG, *Engrg. Research Dept.*, Anaconda Copper Mining Co.

Rock Bolting Heavy Ground in Colorado
SERGEI E. ZELENKOV, *Supt.*, Kokomo Unit, American Smelting & Refining Co.

Rock Bolting in the Keyhole Diversion Tunnel
KIRK H. FOX, *Partner*, Gates & Fox Co.

Roof Bolting at U. S. and Lark Mine
BENTON BOYD, *Supt.*, Lark Section, U. S. and Lark Mine, U. S. Smelting Refining & Mining Co.

Combined Metals' Roof Bolting Experience
E. S. MCINTYRE, *Mine Engr.*, Combined Metals Reduction Co.

TAXATION

Chairman: HENRY B. FERNALD, *Chairman*, Tax Committee, American Mining Congress

GOLD AND MONETARY PROBLEMS

Chairman: DONALD H. MCLAUGHLIN, *Chairman*, Gold Producers Committee, American Mining Congress

Rights of the American Gold Producers
HON. PAT MCCARRAN, *U. S. Senator from Nevada*

Does the U. S. Gold Policy Make Any Sense?
PHILIP CORTNEY, *Columnist and Pres., Coty International*

ROASTING AND SULPHUR RECOVERY

Chairman: MAX W. BOWEN, *Vice-Pres. & Gen. Mgr.*, Golden Cycle Corp.

New Fluosolids Experience
G. G. COPELAND, *Process Engr.*, The Dorr Co.

Suspension Roasting of Sulphides
K. D. MCBEAN, *Metallurgical Engineer*, The Consolidated Mining & Smelting Co., of Canada, Ltd., presented by E. A. Mitchell, *Engr.*, Cominco

URANIUM MINING

Chairman: BLAIR BURWELL, *Mgr.*, Climax Uranium Co.

Uranium Production in Colorado Plateau Area
FRANK H. MACPHERSON, *Mgr. of Colorado Raw Materials Operations*, U. S. Atomic Energy Commission

Use of Geology in Guiding Exploration
R. P. FISCHER, *Project Chief*, U. S. Geological Survey

Progress of Exploration in the Colorado Plateau Area
THOMAS W. OSTER, *Chief*, Grand Junction Exploration Branch, Division of Raw Materials, AEC

New Developments in Exploratory Drilling for Uranium Ore
R. G. SULLIVAN, *Vice-Pres.*, Minerals Engineering Co.

Uranium on the Navajo Reservation
CATO SELLS, Farmington, N. M.

The Grants Deposit
T. O. EVANS, *Mining Engr.*, Atchison, Topeka & Santa Fe Rwy. Co.

STRATEGIC MINERALS

Chairman: S. H. WILLISTON, *Chairman*, Strategic Minerals Committee, American Mining Congress

●

7:30 p.m. ANNUAL BANQUET—Cocoanut Grove and Embassy Room, Ambassador Hotel

Toastmaster: DONALD A. CALLAHAN, *Pres.*, Callahan Consolidated Mines, Inc.; Vice-President, American Mining Congress

Special entertainment—Dancing

Thursday-Friday

OCTOBER 25-26

Field Trips (See pages 45 and 51)

Members American Mining Congress Staff

JULIAN D. CONOVER
Secretary

A. W. DICKINSON
Legislation

JOHN C. FOX,
Editor
Mining Congress Journal

P. D. McMURRER
Assistant to Secretary

HARRY L. MOFFETT
Publicity

WILLIAM I. POWELL
Taxation

(*Continued from page* 45)

rockets and other missiles is carried on. Inspection of the naval base finished, a short bus trip will bring the party to Trona for lunch. After lunch an opportunity will be afforded to see the famous Searls Lake mineral deposits and American Potash's 32-acre plant which extracts approximately 700,000 tons of heavy chemicals per year from the 4,000,000 gal of brine which are pumped daily from the Lake. The huge chemical equipment necessary for the intricate process used is particularly impressive.

The last trip of the series is a bus-boat tour of the more important industrial areas of Los Angeles, the oil producing wells of Wilmington and Long Beach and a voyage through the harbor to see the Port of Los Angeles which has grown so rapidly in the last quarter century. Following this trip a limited number of interested trippers will be taken on a tour of the Hancock Desulphurization Plant where sulphur dioxide and elemental sulphur are recovered from petroleum and sour natural gas.

Oil derricks dominate the skyline of Los Angeles Harbor

Time on these two evenings need not hang heavy on the convention-goers' hands. There will be other performances of the opera on Thursday and Friday evenings, and a trip to the "Ghost Town" at Knott's Berry Farm, only twenty miles from the Biltmore, will be a good bet for an evening's entertainment. Here delicious food is served in an authentic reproduction of a Mother Lode mining town complete to dance hall, blacksmith shop, "pitchur" gallery, calaboose, etc.

No one seriously interested in mining will miss the 1951 Metal and Non-metallic Mineral Mining Convention at Los Angeles. Here the opportunity is offered for every mining man to take part in a thorough airing of all the most important problems confronting the industry. Both Mr. and Mrs. Mining Man, USA, will be glad they visited Los Angeles, for they will have taken part in stirring events and enjoyed a week of reunion with old friends and made many new ones.

Central shop facilities include complete cutting and welding equipment, as well as band sawing machines and other machine shop equipment

Hanna's Maintenance Program

A Detailed Maintenance Program Helps This Company Get The Most Use From Its Mining Equipment

By D. S. KLECKNER,
Supt. of Shops
Hanna Coal Co.
Division of Pittsburgh Consolidation Coal Co.

PRESENT day material shortages, with even greater cutbacks threatened, make a good maintenance program more important than ever in the continuous fight to keep repair time at a minimum and production at a maximum.

Hanna Coal Co., Division of Pittsburgh Consolidation Coal Co., realizes this and has devised a procedure for equipment maintenance which answers all of the requirements of a good program.

At the present time Hanna is mining from both the Pittsburgh Nos. 8 and 9 coal seams. It has deep mines in the No. 8 and is strip mining the No. 8 and No. 9, sometimes referred to locally as the 8-A. Production in 1950 was 2,468,480 tons from the deep mines and 3,702,479 tons from the surface operations.

Maintenance by Units

In this program, Hanna employs what has been referred to as the unit or package system. That is, each machine is regarded as being made up of a group of units and when a part of any unit needs repairing, the whole unit is replaced rather than the broken or damaged part.

This requires some engineering to determine of what each unit should consist and how unit changes can be simplified and speeded up. As an example, under the Hanna system the bucket on a stripping shovel is considered a unit. If a bucket is damaged in such a way that repairs would require more time than replacement, a new bucket is installed, and the damaged one fixed.

With this philosophy constantly in mind, training has reduced the bucket change time on the large stripping shovels from 20-24 hr to 5½ hr.

Maintenance Organization

Each of Hanna's deep mines has a machine shop with a master mechanic in charge and, if the operation is large enough to merit it, also has an electrical foreman and a maintenance foreman. Under these men are the mechanics, classified as 1st class, 2nd class and mechanics' helpers.

Mechanics, working from an inside shop, take care of mechanical breakdowns on one or more sections, depending on how far they are apart. Spare loading machines are kept in each mine for speedy substitution if needed. Small repair or replacement parts are kept with the mechanic and larger parts are sent in from the outside, generally on an empty trip. Communication between sections on the inside and between inside and outside is by telephone.

In the underground operations, machine operators make only very minor repairs on their equipment. When the work is done by mechanics, who are thoroughly acquainted with the equipment and more qualified to do the work, it is of a more permanent nature.

At the strip pits, with larger and more widely dispersed equipment, the maintenance organization is more complex. When it is understood that the large Marion stripping shovels with 45 and 50 cu yd buckets operate 24 hr a day, seven days a week and that their average down time for mechanical and electrical repairs is only 10 percent, it can be realized what good maintenance has meant.

Here there is a shop with a superintendent of maintenance and an in-

spector of maintenance. Under a master mechanic, a Bull Gang or job foreman has charge of general field maintenance. An electrical engineer with an electrical foreman takes care of all electrical maintenance. A general foreman is in charge of truck and 'dozer repairs and has under him a trucks' foreman for truck maintenance and another foreman in charge of maintenance on graders and 'dozers.

Shovel operators make any repairs they can on the shovels, such as changing dipper teeth or parts in the door-latch rigging. If they are not able to make the repairs, they radio either the master mechanic who then assigns men for the job or directly to the mechanics in the field. Other equipment operators, when they need a mechanic, go to the nearest radio-equipped shovel and have the operator call for the necessary men or equipment.

Strip pit mechanics work out of a pool known as the Bull Gang. As many men are assigned to any one job as required to handle it properly. The Bull Gang is equipped with a block-truck and a tool-truck, ready to go at all times. This assures a minimum of lost time between the call for mechanics and their arrival with necessary equipment.

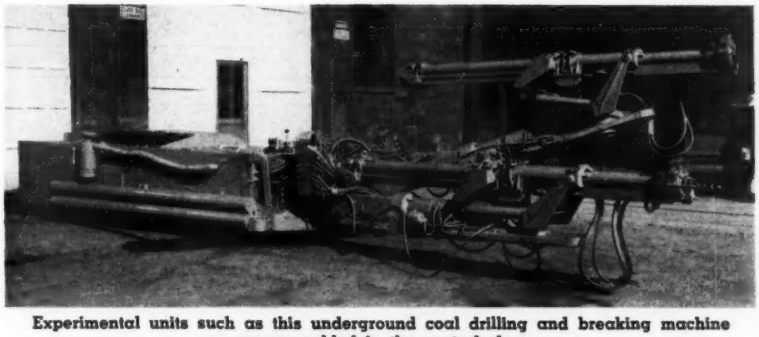
Radio Aids Maintenance

Radio communications play an important part in the maintenance of stripping equipment at Hanna. Each of the large shovels is equipped with a two-way set as are the supervisors' automobiles, mechanics' trucks and shops. In this manner contact is continuous between the widely spaced pieces of equipment, the shops, mechanics and supervisors.

Walkie-talkies are also in use. At times the shovel operators are directed into proper location by a radio equipped ground observer. In addition, mechanics working on the same job on a shovel but far enough apart to make oral communication difficult have used these portable radios to coordinate their efforts.

Lubrication is Important

An important part of maintenance —preventive maintenance—is lubrication. In both underground and surface operations, this is done by special crews. A complete lubrication record can be kept in this way and responsibility rests on a few men. These records assure that each piece of equipment will receive lubrication at the proper time. On each of the shovels in the strip pits, of course, an oiler is on duty at all times.



Experimental units such as this underground coal drilling and breaking machine are assembled in the central shop

A radio-directed tool-truck is ready at all times for assignment to jobs in the strip pits

About the Author

After spending 13 years with Curtiss-Wright Corp., Propeller Division, in various supervisory capacities, D. S. Kleckner joined Hanna Coal Co., Division of Pittsburgh Consolidation Coal Co., in 1946 as mechanical engineer. Since January 1950 he has been Hanna's superintendent of shops.

He is a native of Wisconsin and was educated in mechanical engineering at the University of Wisconsin and Carnegie Institute. His long experience in machine shop work and mechanical engineering certainly make him a valuable contributor to MINING CONGRESS JOURNAL.

First echelon truck, grader and 'dozer maintenance is done in the field. A tire-man equipped with truck-mounted compressor, works one shift daily checking tires and inflating them to the proper pressures. The lubrication truck and crew is on duty two of the three working shifts daily. Trucks are greased in the field every two weeks and oil is changed weekly, while 'dozer and grader oil changes are made every 100 operating hours. Both tire and lubrication men fill out work sheets for each machine worked on, telling just what was done, when it was done and how much material was used.

In addition, each tractor operator fills out an operating report giving lost time, cause of delays and a résumé of the work done. By using these records properly, a closer check can be kept on types of breakdowns and causes of mechanical failures.

Whenever a machine (truck, grader or 'dozer) cannot be repaired in the field or is ready for a general overhaul it is taken into the mine shop where the work is performed. Here also, a careful check is kept of the time spent, work done and materials used.

Central Shop for Big Jobs

Hanna maintains a central shop for larger repairs and overhauls. A maintenance engineer is stationed here and works as liaison man between it and the various mines. He advises on certain machine breakdowns, suggests when and what jobs should be sent to the central shop, and checks on

This fifty cu yd bucket unit is being transported from the central shop (in background) to pit for installation

the performance of shop overhaul or redesign work.

This engineer also supervises trial of experimental machines, many of which are designed and built in the central shop, when they are placed in operation; making tests and observations to assure that the machine is mechanically sound and will do the job for which it is designed.

A superintendent of shops is in charge of the central unit. Two foremen, one on each of two working shifts, supervise the general machine shop work. One foreman is in charge of the deep mine loading machine overhauls. Since these are all Goodman loading machines, he is referred to as the Goodman overhaul foreman. A locomotive and electrical foreman has charge of all the mine locomotive and electrical work which is assigned to the central shop. There is a foreman for general work who has charge of shovel repairs and underground assemblies in the shop. All welding is done under the supervision of a welding foreman.

Work is Dispatched

Every piece of equipment that enters the central shop first goes to a dispatcher. He assigns it a job number, notes the mine from which it came, the mine order number, date and description of work to be done. This information is entered on three forms; one is attached to the part, one given to the proper foreman, and the third goes to the central shop clerk's file. The foreman keeps an account of the time spent on the repairs, broken down into time for cleaning, welding, machining, wiring and mechanical work. The men turn in separate time cards (I.B.M. system) to the shop cost clerk, who makes a dollars and cents plus overhead charge. The shop clerk also enters the material charge (from warehouse requisitions) and totals the cost. When the job is ready to go back to the mine a complete list of the work done and parts used goes with it and the total cost is charged to the mine.

The tag assigned to the part when it first enters the shop is in three parts. One is retained in the shop when the piece of equipment is shipped, one is kept by the driver when it is delivered and the other is put on file at the mine. Before this system of receipts was inaugurated, it was not uncommon for a part to apparently get lost along the line and not be returned. The use of these tags has eliminated this problem.

As mentioned before, maintenance work is brought into the central shop only when it cannot be properly done at the mine shops. Any large, highly-stressed parts, such as castings or large fabrications, coming into the shop for repairs are first Magnafluxed, and then sent to the proper maintenance section. Thus it is determined whether the pieces have any weaknesses or cracks which should be repaired before any other work is done.

An attempt is made to overhaul the underground loading machines once a year. At this time they are completely torn down and rebuilt. Any part that will not give an additional three months service is replaced. No winding or baking of electrical equipment is done by Hanna. All of this work is sent out to local firms.

Mine Mechanics Valuable

Just a word should be devoted to the recruiting and training of Hanna's mechanics. As a rule, at the underground operations, mechanics are either taken from the ranks of machine runners or men with the

SHOVEL PERFORMANCE
JULY 1951

	46-A	46-B	46-C	46-D
Yards per Hour (Bank Measurement)	2,170	1,895	1,875	1,938
Time per Pass (Seconds) "	56.73	63.13	65.14	62.28
Yards per Pass "	34.19	33.24	33.93	33.54

OPERATING TIME LOST DUE TO MAINTENANCE REPAIRS

	July 1951 46-C %	Year to Date Monthly Average 46-C %
MECHANICAL:		
Wire rope	.27	.19
Propel	..	.12
Dipper teeth	.13	.14
Door latch and trip cable	.49	.31
Other bucket repairs	.03	1.37
Boom repairs	..	.01
Rail repairs	.44	.49
Main frame repairs	..	.05
Lubrication	..	.05
General repairs	..	3.02
Miscellaneous	1.87	1.29
TOTAL MECHANICAL	3.23	7.04
ELECTRICAL:		
Motors and generators	.24	.52
Control and wiring	.05	.09
Miscellaneous	.08	.02
TOTAL ELECTRICAL	.37	.63
POWER:		
Cable moves	.20	.42
Cable failure	.24	.16
Power failure	..	.32
Miscellaneous	.03	.01
TOTAL POWER	.47	.91
DRILLING AND BLASTING	.56	.37
DEADHEADING	1.08	1.51
CLEAN PIT AND ROAD BUILDING	..	.66
MISCELLANEOUS	.54	.80
GRAND TOTAL	6.25	11.92

needed qualifications are hired. Deep mine mechanics are given training in the underground shops before they are sent out into the various sections of the mine for mechanical work. The strip operations and central shop draw their men from the local labor market, choosing men who have a mechanical aptitude and varied mechanical experience.

Four graduate mechanical engineers are now in training at the central shop. They are moved around, from job to job, in order to give them more experience and are also given an opportunity to make more decisions than a mechanic ordinarily would. In this manner Hanna is building a reserve from which qualified supervisors can be drawn as they are needed.

Shop Facilities Complete

Facilities of Hanna's central shop are elaborate; they have to be. The total number of stripping shovels built of the size used in Hanna's strip mines is not very large and, since the parts used in these machines are necessarily large and expensive, few spare parts are carried in stock, either by the manufacturer or the various users. This applies in particular to seldom used parts which may be broken very infrequently by some accident. To insure procurement of such parts, the shop is equipped to fabricate and machine them. This includes complete cutting and welding equipment, as well as band sawing machines and all other standard machine shop equipment.

Plates up to six in. and shafting to 12 in. diam are carried in stock. An unusual feature for a mine operation is the heat treating equipment used for quenching and tempering various parts, as well as relieving stress on welded fabrications.

To keep all of the equipment busy when it is not being used on special jobs, small and much used parts are made and stockpiled. Hanna is not in the parts manufacturing business, however, and does this only to keep the men and machines occupied during lulls. A complete record system shows which parts can be made more cheaply than they can be bought.

A complete engineering staff is maintained. This, together with the complete machine shop, has done much to reduce maintenance through the redesign and construction of those parts which may be a constant source of trouble. Much use is made of special alloy steels in fabrication work, as well as changes in the geometry of parts for the maximum strength.

To further this know-how, Hanna proposes to begin classes for its mechanics in trigonometry and gear design. Planned on a voluntary basis, the program has already attracted much favorable attention from the workmen.

Up Production with Records

Records play an important part in preventive maintenance at Hanna, and are kept on all repair work done in the company. From these records it is possible to see where savings can be made and output increased. In one instance the truck records showed that more than the usual amount of time was being spent on spring replacements and repairs. Investigation showed that bad roads were the cause. Prompt repair of the roads decreased spring damage.

Information based on the records kept of the large shovels, showing time lost due to maintenance, indicates where effort can be directed to decrease down time and increase production time. From the shovel records shown a comparison can be drawn between down time for the month, percentagewise, and for the monthly average of the year.

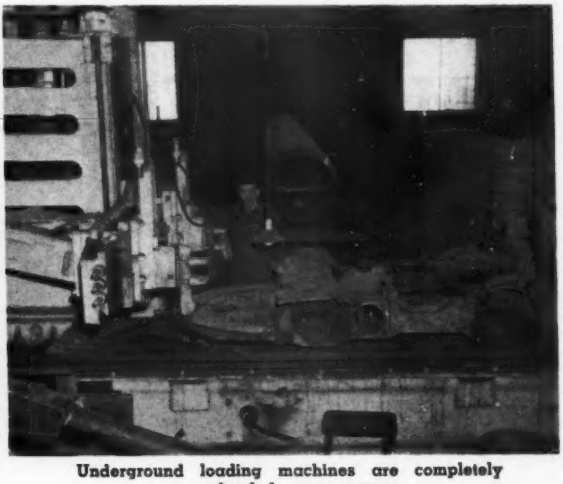
A look at the records shows that in July 0.49 percent of operating time was spent on door-latch and tripcable repairs. Further investigation points out that monthly average down time for the same repairs is only 0.31 percent. Thus it is seen that more than average time was spent on these repairs and an investigation into the problem is indicated.

Shovel performance records do not have any direct relation to maintenance. However, they are a good example of what records, used in the right way, can do. Before these records were given to the shovel operating crews, the yards per pass and yards per hour handled by each shovel varied quite widely. Now that the records are available to the operating department, variance in yardage has decreased, while yardages handled have increased. This is due to the accurate analysis of operation shown on these reports which suggests to the alert foremen and crews their bad spots. It also serves as an accurate score board, thus encouraging competition which is greatly beneficial.

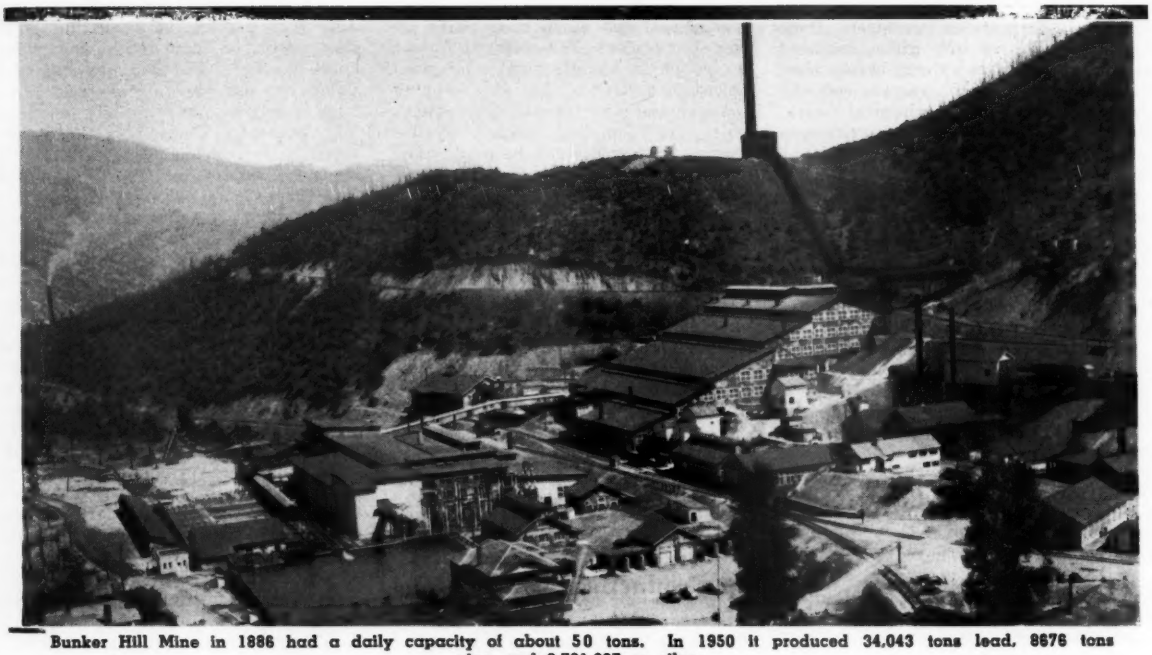
Although maintenance is not directly influenced as a result of these figures, it is affected indirectly. If an operator is trying to increase his machine's productivity, it is to his benefit to keep it operating as much of the time as possible and he will, therefore, treat it properly.

This is how Hanna is carrying on its maintenance program, and, as James Hyslop, president, said in a recent address, "Although we feel that we can safely say that results have proved that we are fairly successful in our attack on difficult maintenance problems, we feel that we have only scratched the surface and the more competent an organization becomes, the more it realizes the shortcomings of its work and the horizon of possible improvements becomes larger and larger."

Heat treating equipment aids in relieving stress in weldings and castings



Underground loading machines are completely overhauled once a year



Bunker Hill Mine in 1886 had a daily capacity of about 50 tons. In 1950 it produced 34,043 tons lead, 8676 tons zinc, and 2,701,927 oz silver

The Coeur d'Alene District—A Mining Empire

Deeper Mine Development and Increased Exploration Efforts Add Large Reserves to Nation's Metal Supply

By H. W. INGALLS

Mullan, Idaho

ONE of less than a dozen mining districts in the world with a total production of over a billion dollars in metals from its own mines, the Coeur d'Alene mining district in Shoshone County, Idaho, has long been the largest silver producer in the United States. Its lead output is the second largest in the country, and for the past two years it has led the nation in zinc production. All the producing mines in the area lie in a zone running roughly east and west, about 30 miles long and 10 miles wide. Within this area lie the cities of Kellogg and Wallace and the town of Osburn. The district is divided into two zones by the major sized Osburn fault which runs the length of the field and extends over the state line into Montana.

On the north side of this fault the ore deposits are largely silver-lead-zinc, while those on the south side, east of Kellogg, contain silver, copper and antimony. One notable exception to this rule is the Silver Syndicate, a silver-lead mine, south of two important silver-copper-antimony properties operated by the Sunshine Mining Co. At Kellogg two major silver-lead-zinc deposits occur south of the fault and the Pine Creek zinc-lead belt lies still further to the south.

Biggest and Oldest Mine

Bunker Hill Mine is the largest silver-lead-zinc mine in the United States and has been in continuous operation since 1885. During 1950 the main Number One shaft in this mine was sunk to a point 1200 ft below sea level. A new ore body reported in 1949 on the Number 17 level has proved of first importance. The same ore body was also encountered on the Number 18 level.

The crosscut from the main shaft on the lowest mine level, the Number 25 level, has disclosed what is believed to be the first of the ore occurrences expected on this level. During 1950 the Bunker Hill Mine produced 34,043 tons lead, 8676 tons zinc, and 2,701,927 oz silver. These figures are substantially higher than those reported for previous year. With exploration work being pushed and the metal market remaining favorable, this, the oldest mine in the district, has probably not yet reached its peak capacity.

Sunshine Shares Profit

Development of the area immediately south of the Osburn fault east of Kellogg started with the opening of the Sunshine Mine. After some lean years of searching and comparatively small ore bodies the Sunshine workings reached the 1700-ft level, where they first hit the "jack pot." This was a big body of high grade silver-

copper-antimony ore. From the 1700-ft level to the 3700-ft level the vein developed ore shoots which have continued to produce varying tonnages of these metals to a point 1000-ft below sea level. Recent development work in other parts of the mine has now increased the known ore depth to 3850 ft. Sunshine's underground exploration in recent years has developed parallel veins of equal richness. These are partially owned by other mining companies in partnership with Sunshine.

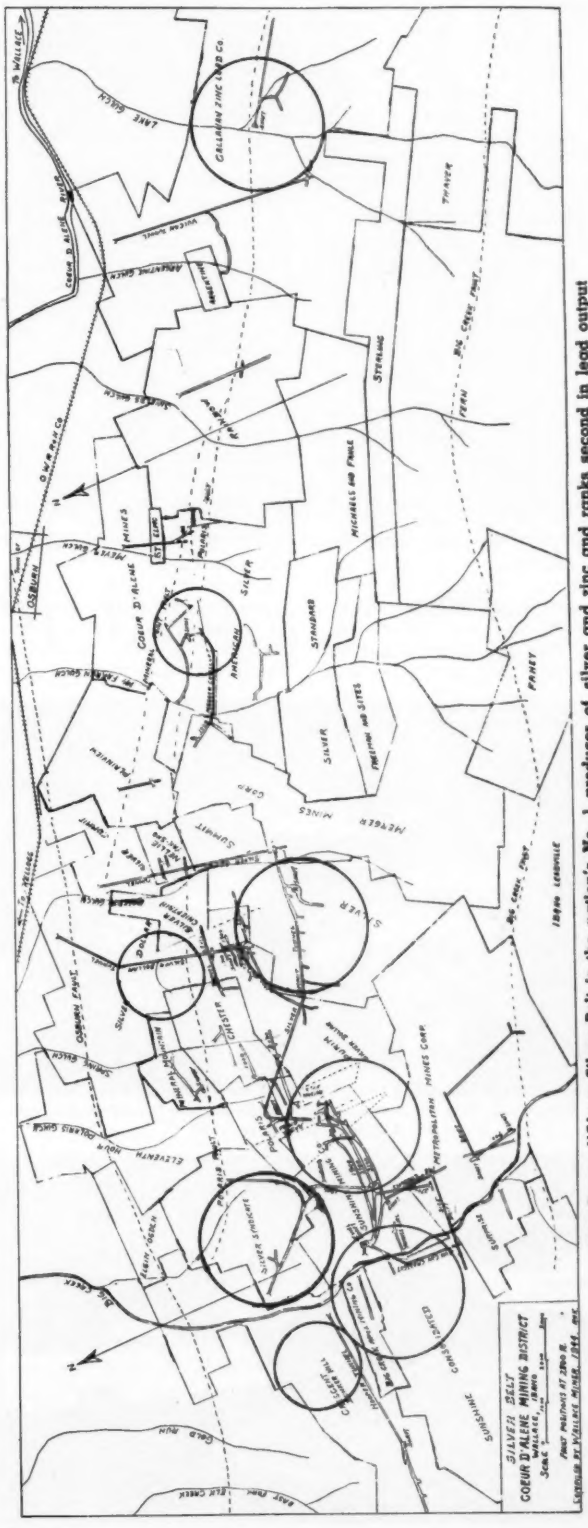
The first new development was a few hundred feet north of the Sunshine vein system on the 2700-ft level, where in 1943 Sunshine and Polaris Mining Cos. opened a highly productive area in the Chester vein more than 1000-ft in length. Mine-run ore from this area produced an average mill feed of 44.6 oz of silver and 6.3 percent lead per ton according to Sunshine's annual report, together with an undisclosed amount of copper.

To facilitate production and avoid any dispute over extralateral rights, an agreement was entered into between the Sunshine Mining Co. and the Silver Dollar Mining Co. to share the profits from this Rotbart area on a 50-50 basis. Another portion of the same oreshoot is called the "Omega" and production from it is shared half by Sunshine and half by Polaris Mining Co. Still another productive area is called the "Rambo." Here production is shared equally between Sunshine and Silver Syndicate Mining Cos. On the east end in the Rambo area the vein was intersected by the Silver Syndicate fault system. This apparently cut off the rich silver-copper vein. Sunshine, however, diamond drilled south through this fault and discovered a large and rich vein of silver-lead ore on the south side of the fault. This area is now in production on good silver-lead ore. This vein has now been developed to the 3850-ft level, 1150 ft below sea level.

Sunshine has also opened the Yankee Girl vein system on the 3100-ft level, 1000 ft south of the Sunshine vein and developed commercial sized silver-copper ore deposits in Sunshine Consolidated Mining Co. ground to the west and in Metropolitan Co. claims to the east, both of which are producing.

Explore Chester Vein

Silver Summit is the next producing mine along the silver belt 2000 ft east of Sunshine. This property was prospected down to the 1500-ft level but little or no ore was found. Hecla and Polaris Mining Cos. purchased control of Silver Summit stock about eight years ago and continued a 3-compartment shaft from the 1500 to



The Coeur d'Alene Silver Belt is the nation's No. 1 producer of silver and zinc and ranks second in lead output

the 3000-ft level to prospect the Chester vein in this area. In a crosscut from the bottom of the shaft a small streak of high grade silver-copper ore was encountered in Silver Summit ground. This later developed into an oreshoot more than 800 ft long with widths up to 15 ft. The vein has since been opened on the 3200 and 3400-ft levels where its dimensions are equally impressive.

Deepen Vulcan Shaft

The company has also opened the Chester vein in both Chester and Silver Dollar Co. ground further south. In both of these projects commercial sized ore deposits were found but have not yet been fully developed.

Next, and a most important recent development on this mineral belt, is at the Vulcan shaft 18,000 ft east of the Silver Summit. The Vulcan is a portion of the ground owned by the Callahan Zinc-Lead Mining Co., and was operated by that company to the 1200-ft level. It had been idle for many years prior to 1948, when the American Smelting & Refining Co. leased the group for a period of 60 years and started to sink a 4-compartment shaft to sea level depth, approximately 3000 ft. Day Mines, Inc. joined AS&R in this enterprise and have paid one-fourth the cost of the shaft.

Under management of its local subsidiary, the Federal Mining Co., AS&R started sinking from the bottom of what was known as the Galena shaft on the 1200-ft level and continued to 3000 ft, without stopping to prospect on any intermediate levels. On reaching the 3000-ft objective, crosscutting was begun north and south from the shaft in October 1950 and almost immediately opened mineral zones apparently of economic importance, according to J. E. Berg, general manager of Federal. The north crosscut intersected a silver-lead vein 2 to 5-ft wide which assays showed was well worth mining.

The south crosscut encountered a zone of bluish tinted Revett quartzite about 20 ft wide mineralized with bunches and streaks of galena ore. Immediately adjoining this area the crosscut entered a shattered quartzite zone 35 ft in width which was also mineralized and showed one streak 27 in wide containing silver, lead and zinc.

A few feet further to the south, approximately 110 ft from the shaft, the crosscut entered a well defined vein two ft wide at the point of intersection and rich in silver, lead and zinc with appreciable amounts of copper.

Continuation of the crosscut to a point 260 ft from the shaft opened still another vein 3½—4 ft wide also carrying high values in silver and lead.

A heavy flow of water at this point temporarily delayed operations but when heavier pumping equipment was installed crosscutting was resumed. Development ore mined has all been trucked to the company's Morning Mill at Mullan for treatment.

In its last annual report Callahan Zinc-Lead Co. stated that Vulcan Silver-Lead Co. (a subsidiary of Callahan) will receive a royalty from net smelter returns until the lessee recovers capital investment, and a working capital fund is established, after which AS&R and Vulcan will divide profits on a 50-50 basis.

Develop Fern Group

Day Mines, Inc. owns a large block of ground called the Fern group adjoining Vulcan on the south. The Day Co. is now starting development of this group through the Rainbow Tunnel in Shield's gulch further west.

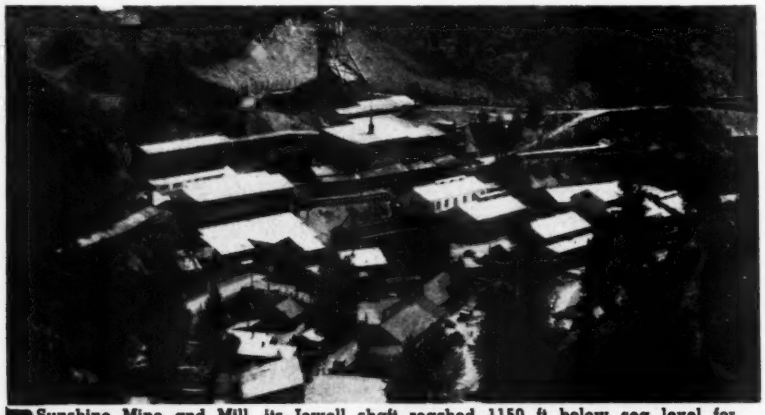
Several years ago P. J. Shenon, after making a geological study, mapped this south side mineral belt from the Sunshine mine as far east as Placer Creek, just east of the Vulcan shaft. No other extensive geological study was made until 1947 when the United States Geological Survey and the U. S. Bureau of Mines started a resurvey of the entire Coeur d'Alene district, including the unmapped territory east of Placer Creek to the Montana state line east of Mullan, a distance of approximately 12 miles. Hecla, Day Mines and many other mining companies have large holdings in this part of the district.

Extend Exploration East

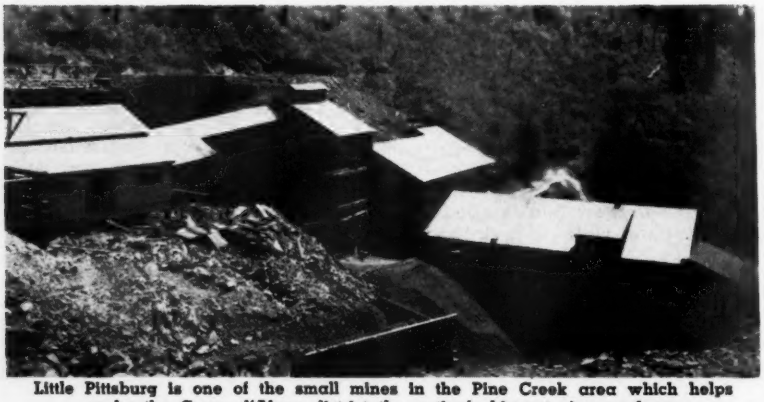
One result of the discoveries in the Vulcan shaft was increased activity further along the Silver Belt for a distance of at least ten miles east of Wallace. First to enter the field was a company owned equally by Hecla, Newmont, New Jersey Zinc and Atlas to develop a block of mining ground some two miles wide by seven miles long, extending from halfway between Mullan and Wallace east to and beyond the Idaho-Montana state line. The company will confine current development work to a project on the Atlas property at Mullan, first sinking the Atlas shaft from the 800 to the 2400-ft level. Here a crosscut to the ore zone will be driven.

Day Mines, Inc., was the next big company to enter this field by purchasing the Hunter Mine at Mullan. In a separate transaction with Inde-

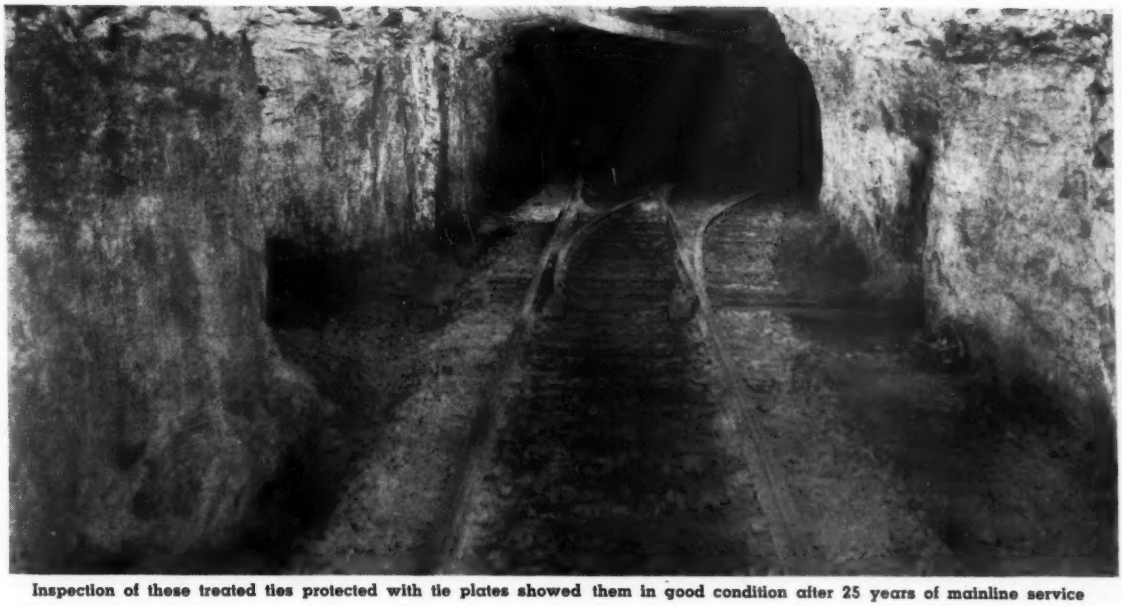
(*Continued on page* 79)



Sunshine Mine and Mill, its Jewell shaft reached 1150 ft below sea level for 251,877 tons of ore in 1950



Little Pittsburg is one of the small mines in the Pine Creek area which helps make the Coeur d'Alene district the nation's biggest zinc producer



Inspection of these treated ties protected with tie plates showed them in good condition after 25 years of mainline service

Treated Ties in Mine Haulageroads

A Report by the Haulageroads Committee Which Points Out How the Use of Treated Ties Produces Savings In Time, Labor and Money.

By R. W. WATSON and A. E. BELTON

FOR many years the railroads, utilities, highway departments and general contractors have utilized treated timber in tremendous quantities. The primary purpose in its use has been to reduce the frequency of renewal and thereby realize a saving in maintenance cost. To a great extent, increasing use of treated timber is an important factor in forest conservation. Of all industries, the railroads have been and continue to be the largest users of treated wood. Crossties and switchties constitute by far the major portion of their treated timber requirements.

During 1949 approximately 30,000,000 new crossties were used by America's railroads. Of this quantity, 28,800,000 or 96 percent were treated. Service experience and actual replacement records set the average life of pressure-treated crossties at 28 years. Renewals by the railroads now run at about 114 ties per year per mile of track, or four percent of 2850 ties per mile.

Nearly every mile of standard gauge railroad is considered "permanent track," which justifies the use of long-life ties. The coal mining industry also has permanent trackage, yet during 1949 used about 430,000 treated crossties which, if placed on 24-in. centers, would support only 163 miles of track. Since this is but a small percentage of the total main line mileage underground, it would seem that a great many coal mines are overlooking an effective economy measure.

Treated vs. Untreated Ties

High wage scales coupled with the necessity for uninterrupted movement of both loaded and empty cars require a mine haulage capable of withstanding heavy, high-speed traffic with a minimum of maintenance and repair. To insure operating efficiency and maintenance economy, such a haulage road should incorporate the use of treated ties. At present, the purchase price of a 5-in. by 7-in. by 6-ft pressure-treated tie is about $1 more than that of an untreated one. But the greater purchase cost is rapidly absorbed by the subsequent low maintenance cost and in just a few years the higher investment for the long-life treated ties will have been repaid. An example is offered here to illustrate this point by a comparison, on a theoretical basis, of labor and material costs in the use of treated vs untreated mine ties.

This comparison covers tie installation and maintenance of two main haulways, one using treated and the other using untreated ties, both operating under similar conditions in a six-ft seam of coal. Each haulage is assumed to be one mile long, with 60-lb rail laid on 5-in. by 7-in. by 6-ft ties placed on 24-in. centers—2640 to the mile. The installation covers the cost of ties and labor directly related to their handling in the complete sequence from the supply yard to "in place" on the roadbed but does not include grading, draining, ballasting

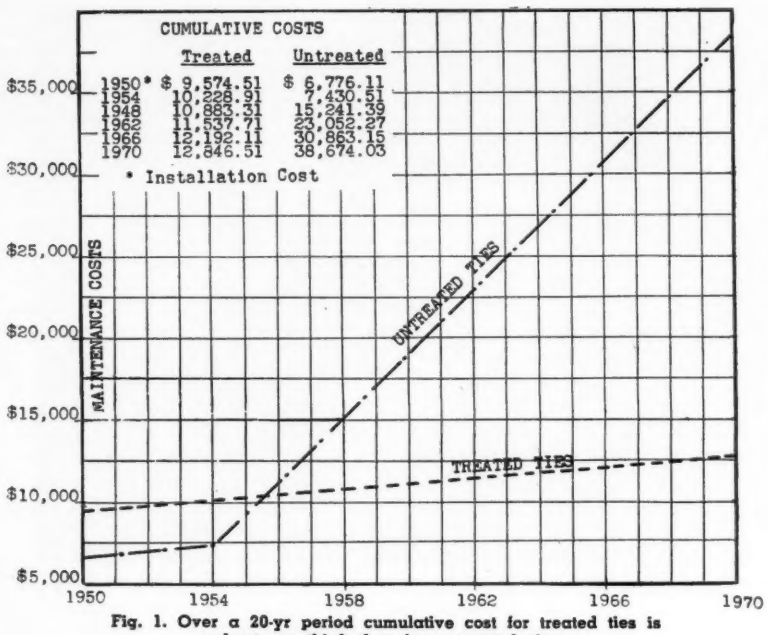


Fig. 1. Over a 20-yr period cumulative cost for treated ties is about one-third that for untreated ties

and laying rail. Maintenance costs are based on the assumption that treated ties have a service life of 20 years and untreated ties a service life of four years. Prices are at 1951 rates; trackmen wages $2.045 per hour; pressure-treated ties $2.11 each and untreated ties $1.05 each.

Before bringing the comparisons to a dollar and cents basis, it is first advisable to make an analysis to show all of the factors which enter into mine haulage road costs, omitting consideration of the haulage operation itself. On this basis the cost items fall into three main divisions: (1) installation or construction, (2) maintenance, and (3) replacement, including the labor and materials for each division. Table 1 compares these items as they apply, over a life of 20 years, to mine track laid with treated and also with untreated ties. On the assumption, as given in the preceding paragraph, that there will be no treated tie replacements during this time and that replacement of the untreated ties will start after the first four years of service. This report does not contemplate an immediate renewal of all untreated ties at the end of each four-year period, but assumes an annual deterioration rate of 25 percent or 660 ties per year.

Tie Costs Compared

The analysis in Table 1 makes a complete breakdown. Table 2 translates these items into dollars and cents, giving the costs of installation, maintenance and replacements for each of the two classes of ties. Table 3 summarizes the costs on a 20-year basis and the curves in Fig. 1 compare the results.

Keeping in mind that the figures are theoretical, although based on actual experience, they tell an interesting story. The first cost of treated ties for a mile-long haulageway is about $2800 more than for untreated ties. This lower cost applies for the first four years when maintenance is the same for both classes of ties. Then replacement begins to take effect and at 5½ years the curves cross, indicating that the costs have become equal. From that time on replacement of untreated ties will amount to $1952 per year per mile, as compared to an annual track maintenance (without replacements) of $163 for treated ties. In other words, after 5½ years service, a one-mile haulage road laid with untreated ties costs nearly $1800 a year more to maintain than one using treated material. At this rate, over a 20-year service life the use of treated ties will effect a total saving of $25,827 per mile of track (interest not included).

Recovery and Re-use

These examples are based on mainline track with an assumed life of 20 years. However, the economy of treated ties is not necessarily limited to long-life haulageways of that particular type. There are further savings possible because treated ties can

TABLE 1

TRACK LABOR FOR TREATED AND UNTREATED TIES TO INSTALL AND MAINTAIN A MINE HAULAGEWAY ONE MILE LONG

	Treated Ties	Untreated Ties
Installation		
1. Handling from timber yard to supply cars. Two men load a 60-tie car in 30 min or total of one man-hr per car for 44 carloads per mile of track	44 man-hr	44 man-hr
2. Handling from supply cars to stacks along ribs; same as item 1	44 man-hr	44 man-hr
3. Handling from stacks to approximate position in road-bed. Two men distribute 60 ties over 120 ft of bed in 75 min or 2½ man-hr per car for 44 carloads	110 man-hr	110 man-hr
4. Aligning, spiking and tamping. Two men utilizing two min aligning, three min spiking and 15 min tamping for a two-man total of 40 min per tie for 2640 ties	1,760 man-hr	1,760 man-hr
Total	1,958 man-hr	1,958 man-hr
Maintenance		
5. Annual maintenance includes retamping, driving loose spikes, checking joints and spotting for replacement. Two men work a total of five days during the year or 80 man-hr annually	20 years 1,600 man-hr 4 years 320 man-hr	
Annual Replacements	None	660 ties
6. Repetition of first operation for 25 percent replacement of untreated ties		11 man-hr
7. Handling from supply cars to scattered spots. Two men spot unloading average two min per tie for a carload of 60 ties—a total of four man-hr per car for 11 carloads—660 ties		44 man-hr
8. Pulling spikes, removing and disposing of decayed ties. Two men work three min per tie pulling spikes, three min per tie jacking rails and removing ties, and 2½ min per tie for spot reloading and dumping. A total of 17 man-min per tie for 660 ties		187 man-hr
9. Inserting, spiking and tamping replacements. Two men work four min inserting and aligning, three min spiking and 10 min tamping—a total of 34 man-min per tie for 660 ties		374 man-hr
Total	0	616 man-hr

be and have been successfully and economically recovered and re-used.

For example, suppose that a haulage road is being installed in a section of a mine where it is known that the life will be only four years—the assumed life of untreated ties. Suppose further that the operating efficiency and speed of a main haulage is wanted; therefore, the road is graded, drained, ballasted and laid with good rail. Then if there are other haulways projected for future sections of this mine or for other mines in the same locality, treated ties should be used in the short-life haulage. Certainly at the end of four years service the rail, tie plates and angle bars will be recovered and re-used. Why not the ties also?

Wood preservative saves cost of roof support

TABLE 2—ESTIMATED COSTS
INSTALLATION AND MAINTENANCE

Treated Ties	
Installation	
1958 man-hr @ $2.045	$4,004.11
2640 ties @ $2.11	5,570.40
Total	$9,574.51
Maintenance—per year	
80 man-hr @ $2.045	$163.60
Untreated Ties	
Installation	
1958 man-hr @ $2.045	$4,004.11
2640 ties @ $1.05	2,772.00
Total	$6,776.11
Maintenance—per year	
80 man-hr @ $2.045	$163.60
Replacements—per year	
616 man-hr @ $2.045	$1,259.72
660 ties @ $1.05	693.00
Total	$1,952.72

TABLE 3—COST SUMMARY
FOR 20 YEARS SERVICE

Treated Ties	
Installation	$9,574.51
Maintenance—20 years	3,272.00
Total—20 years	$12,846.51
Untreated Ties	
Installation	$6,776.11
Maintenance—4 years	654.40
Replacements—16 years	31,243.52
Total—20 years	$38,674.03

As indicated by the tables, the first recovery cost of a treated tie could be as great as the cost of a new untreated tie and yet be economical. However, since the salvage operation is similar, but in reverse, to the installation operation covered by item 3 of Table 1, the actual recovery cost per tie would be nearer 8½ cents (110 man-hr at $2.045 per hr for 2640 ties). This figure assumes that the labor of pulling spikes, etc. (item 8) has already been done to recover the rail. Thus, it can be said that a pressure-treated mine tie can be reclaimed and re-used not only once but several times, each time economically if its subsequent use is within the life expectancy of the tie.

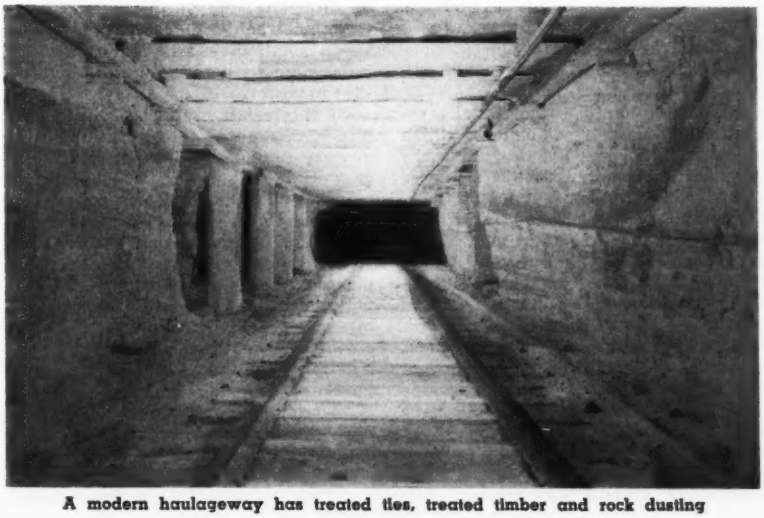
Tie Plates Prove Worth

A recent inspection was made of a main haulage track using treated ties in a northern West Virginia mine. After 25 years of continuous service, the ties were still in good condition and are expected to last the remaining life of the haulage, three-five years. This track consists of 5-in. by 7-in. by 6-ft treated ties *with tie plates* and 60-lb rail with bolted joints. The roadbed is reasonably dry. Haulage equipment is composed of 30-ton locomotives and 10-ton mine cars. Where tie plates were used it was observed during the inspection that the treated ties showed no mechanical wear.

At another location in the same mine, the track was examined where treated oak ties were used on a sharp curve with light grade against the loads. These ties were not protected with plates and as a result were rail-cut within a three-year period as deep as 1¼ in. on the outside of the curve. This example illustrates that plates under certain conditions do add service life to ties. A recommendation contained in "Construction and Maintenance of Main Haulageroads in Coal Mines" published by the American Mining Congress, covers this point as follows:

"Tie plates are not necessary on pressure-treated oak mine ties—when the standards of track construction and maintenance are adequate for the operating conditions. *This conclusion may be reversed* by an adverse combination of some of the following factors: drainage, roadbed, ballast, grades, curves, size of ties, spacing of ties, weight of rail, weight of loads, speed of trips, and density of traffic. Pressure-treated shortleaf pine mine ties need plates to prevent mechanical destruction. Other species of wood vary according to their strength properties."

Other recommendations for modern coal mine tracks are contained in this booklet, such as: specifications covering tie sizes and spacing for various rail weights and rolling loads; switch tie layouts; dimensions for crossovers; standards for frogs, switches and turnouts. The booklet is widely used in the coal industry and could well be carried by track foremen as a part of their regular equipment.



A modern haulageway has treated ties, treated timber and rock dusting

Geochemistry - A Symposium On The Prospector's Newest Tool

Part II Brings to a Close This Important Discussion of a New Technique for Finding Mineral Deposits But Development and Experiments Continue to Broaden its Application and Sharpen its Selectivity.

BY
OWEN KINGMAN
and
GEORGE M. FOWLER

Geochemical Techniques and Results at Ducktown

By OWEN KINGMAN,
Geologist
Tennessee Copper Co.

THE results of geochemical work done at Ducktown, Tenn., by the Tennessee Copper Co. have been moderately encouraging. The objective of this work was to establish the value of determining the various amounts of epigene metal content in the rocks as a guide to ore.

Previous to 1949 some geochemical work was done consisting of chemical analyses of drill core rock but the results were not encouraging. T. S. Lovering's excellent article, "Heavy Metals in Altered Rock Over Blind Ore Bodies, East Tintic District, Utah," rejuvenated interest in geochemistry and encouraged testing a new technique.

Lovering's idea of fractionation with a weak solvent as contrasted to a fusion or spectrographic analysis was followed but was altered in some detail to suit different conditions.

Metal distribution determined by the technique is not considered ideal and some of the results seem contradictory. However, geochemistry has a use in the district to help evaluate possible drilling targets.

The geology of the Ducktown Basin has been well described by Emmons, Laney and others. The ore minerals are pyrrhotite and pyrite with chalcopyrite, spalerite and magnetite. They occur as massive lenticular bodies enclosed by graywacke and schist of the Great Smoky Formation which is probably pre-Cambrian in age. Ore-waste contacts are sharp. The district is zoned with high copper ore (approximately 1.4 percent copper) in the peripheral bodies and low copper (approximately 0.70 percent copper) in the central ones.

The author is indebted to the Tennessee Copper Co. for the opportunity to present this paper, to W. W. Simmons, chief geologist, for guidance during the work and constructive criticism of the paper, and to Edward Swanson for help in the laboratory and in drafting the illustrations.

Sampling Over Wide Area

Rocks and saprolite were sampled over both types of orebodies and over known barren areas. In all, surface samples representing 12,448 ft of cross section were tested with about 3000 analyses. Samples representing 5900 ft of cross-section were taken from over four separate orebodies. These furnished control data indicating the distribution of the metals around ore. The other surface samples were used to establish the distribution encountered in known barren areas and untested magnetic anomalies.

Beds were sampled individually regardless of their thickness which averages 10-15 ft. The surface rocks have been weathered to such a degree it was considered impractical to seek fresh rock samples. Many of the schist beds are resistant enough to form reasonably solid outcrops and in these cases weathered rock fragments of the outcrop were collected. Graywacke is less resistant to weathering than schist. Most of it, as sampled, was soft and crumbled easily and some was weathered to a sandy clay residuum. Samples of the graywacke saprolite were taken from small pits 6-12 in. deep. In addition to the surface rocks, diamond drill core representing 4580 ft of drilling was tested. The core was sampled in ten foot sections without regard to the beds. The samples weighed about two pounds. They were crushed and pulverized at the company sample mill to —40 mesh and approximately 20 grams were retained for laboratory work.

Laboratory Techniques

The laboratory crew consisted of two men, one to weigh samples and add reagents while the other ran tests and recorded the results; the crew averaged 60 samples per day. Their duties included purifying and mixing reagents and tending the water and carbon tetrachloride stills.

In the analyses two grams of sample were treated with 20 ml of 1:5 acetic acid for 20 min. To this was added 20 ml of 1 normal sodium hydroxide and 20 ml of water, giving a solution buffered at about pH 4.75.

This solution was allowed to settle for 20 minutes or more. The settling time varied according to the amount of fine material in the sample. If a too large volume of fine solids is mixed with the carbon tetrachloride solution of dithizone, the silt adheres to the carbon tetrachloride causing it to settle in small globules. This makes it impossible to determine the color of the dithizone.

Of this relatively clear solution, 20 ml. was decanted into a 125 ml. separatory funnel and 5 ml of 0.0025 per cent dithizone solution in carbon tetrachloride was added. This was shaken for two minutes. The dithizone color was then compared and recorded as "total content," implying that no complexing agents were employed. The "total content" indicates the relative intensity of the reaction of all the combining metals at pH 4.75. The intensity of the "total content" reaction governed the decision whether or not to test for zinc and copper. If an abnormal "total content" was not indicated in the first run it was so recorded and no further testing was done. If the "total content" did indicate abnor-

mal amounts of metal that aliquot was tested for zinc by adding 20 ml of 25 per cent sodium thiosulfate and again shaken. Another 20 ml aliquot was tested for copper by adding 2.5 ml. of 1:10 sulfuric acid to lower the pH to about 2.5.

The complexing agent was used because of the great variety of reactions obtained. Except for the copper group, pH adjustments were not selective enough.

No success was had with attempts to run both copper and zinc on the same aliquot by first adjusting the pH to get the copper group, then raising it and adding thiosulfate for the zinc. For some reason part of the zinc was lost in this procedure.

Low order reactions from gossan and even some ore samples created doubt on the efficacy of acetic acid. A 1:5 concentration of acetic acid was used instead of the usual 1:10. In spite of some anomalous reactions the results are reasonably consistent but it may be that some other solvent might attack the desired minerals more vigorously without completely digesting the rock.

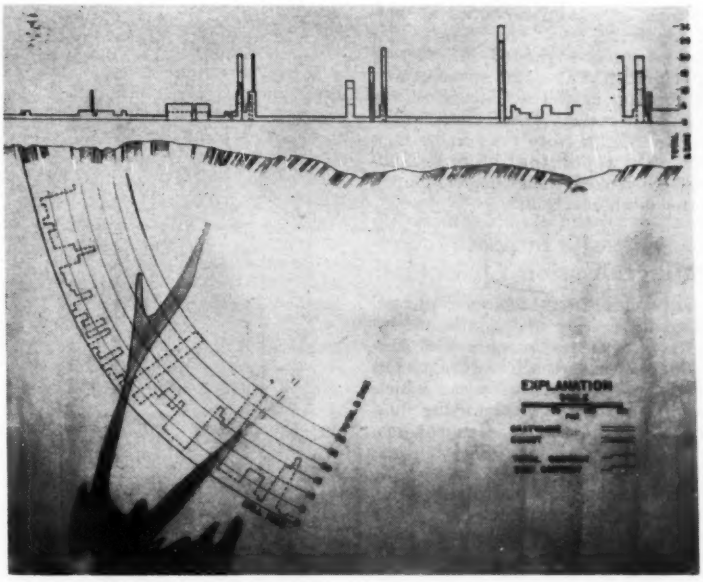


Fig. 2. Total metal content line similar to that of barren area showed appreciable amounts of zinc

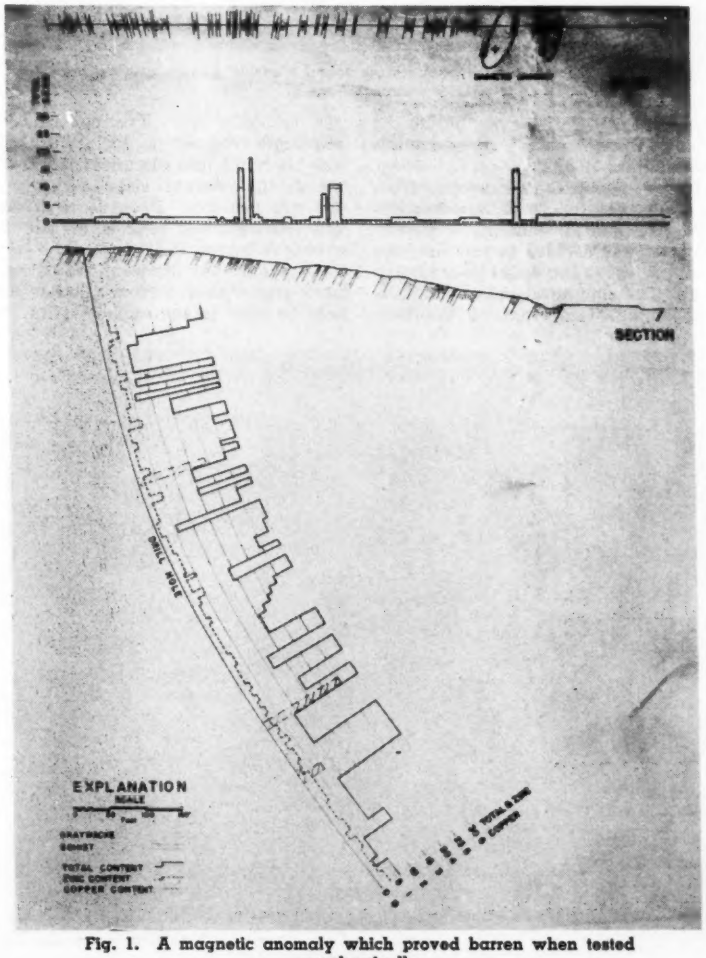


Fig. 1. A magnetic anomaly which proved barren when tested geochemically

Sample Shaker Sped Work

The speed of running samples was increased by using a mechanical shaker. A similar one can easily be made by converting an old fashioned treadle-type sewing machine base. The base was on its back and a ¼ hp motor was connected with a 2-in. pulley to the treadle-wheel, using a ¼-in. rope drive. Two boxes padded to fit the separatory funnels were attached to the treadle. A removable nail through the sides of the box across the neck of the funnel kept the funnel in place. By having one sample in the shaker while the other was being recorded and then a third prepared for shaking, the rate of testing was increased about 50 per cent.

The shaker was also useful for putting the dithizone into solution and purifying thiosulfate. For a stock solution a concentrated (0.01 per cent) solution of dithizone was prepared. This served two functions; it removed the necessity of either mixing large volumes of 0.0025 percent dithizone or frequently weighing up small amounts of the powder with attendant errors. The concentrated solution also saved large volumes of carbon tetrachloride when purifying the thiosulfate.

Color comparison was expedited and made more accurate by preparing a permanent suite of liquid colors. All determinations were made visually. It is difficult to compare the liquid dithizone solution with dry color charts. Since the dithizone colors fade it is preferable to prepare a permanent liquid color suite. This may be done by mixing food coloring with water. No change of color was perceived in three months. The index colors were established by matching them with the

reactions of known amounts of zinc and copper.

This technique yielded satisfactory analyses with reasonable speed. About half the abnormal reactions were run twice for a check. These checks indicate the results were reasonably consistent. In appraising the final tabulation we looked with suspicion upon isolated high reactions.

Results Indicate Mineralization Channel

The results of the tests were plotted on plan and section showing their relation to ore or magnetic anomalies. Several magnetic anomalies were tested geochemically. Four of these which appeared favorable geologically had been drilled and found barren of ore. Fig. 1 shows the results of testing one of the barren magnetic anomaly areas. Surface samples here had erratic but usually low "total content." The amounts of zinc and copper were negligible.

Drill core did not always yield the high "total content" illustrated in Fig. 1. The disparity between the surface and core results is exceptional. The mineral causing the high "total" in this core may have been removed from the surface by weathering. It is significant that the zinc content was about normal and, with three exceptions, attributed to contamination, the copper content was negligible. This lack of zinc and copper was considered symptomatic, indicating the absence of a mineralization channel.

Fig. 2 shows a portion of a low copper orebody and the results of geochemical tests. The total metal content on the surface line is comparable to that of the magnetic anomaly just shown in Fig. 1. However, unlike the anomaly these "totals" carry significant amounts of zinc.

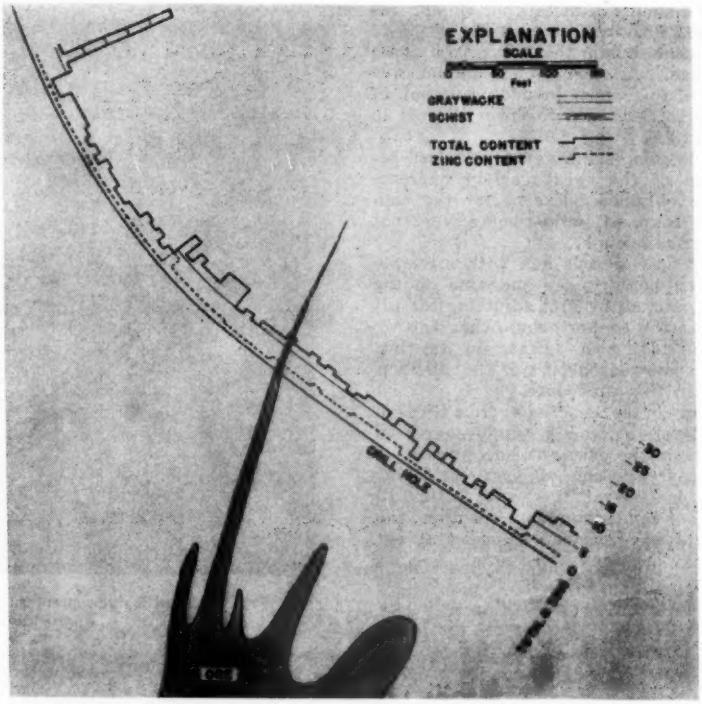


Fig. 3. Occasional low reactions were found close to known ore, contrary to expectations

The first few drill core samples from this hole saturated the dithizone when tested for "total content." Consequently it was decided to test the hole for zinc without the usual preliminary "total." The zinc in this case is significantly higher than that of the barren anomaly ore. The pattern does not show the much desired gradual rise we had hopefully anticipated. Instead, the content rises abruptly at the ore contact. From here toward the footwall, the zinc is erratic but averages higher than normal.

An altogether different set of reactions was obtained from another drill hole in the same orebody (Fig. 3).

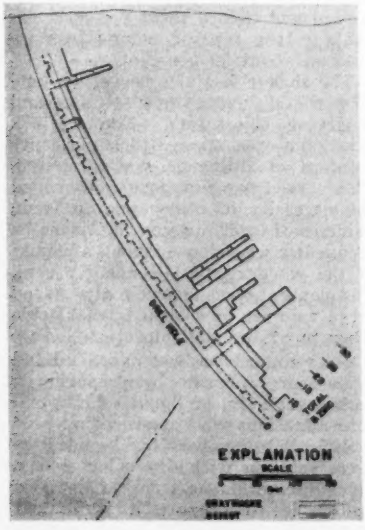


Fig. 4. Significant rise in total metal with accompanying rise in zinc content corrected impression given by unmineralized core sample from ore horizon

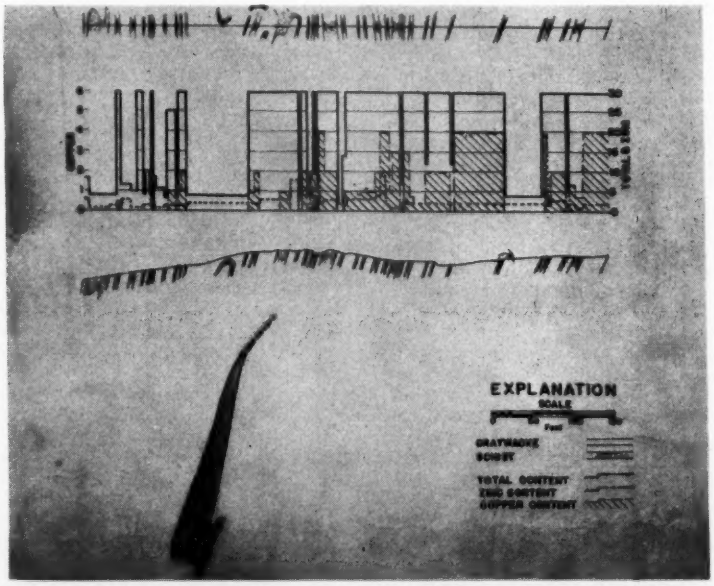


Fig. 5. High copper and zinc content lend significance to high total metal distribution over copper orebody

With one exception the content of this core is about average or below. It is below average down to within 150 ft of the ore. Here the total increases but still is low for an ore area. These results illustrate the low reactions that were occasionally obtained near the ore and were contrary to expectations.

Fig. 4 shows the encouraging results from another hole in this orebody. The core from this hole showed no mineralization where it crossed the plane of the vein more than 300 ft from ore. The distinct rise in the "total content" accompanied by an increase in zinc is considered significant.

Fig. 5 illustrates the distribution of the metals along a line over a high copper orebody. The illustration shows a high "total content" distribution, particularly up dip from and to the footwall of the ore. The copper has a similar distribution. The zinc content is about normal with a few high exceptions. High copper and the occasional high zinc lend significance to these reactions.

Tests of other surface lines over ore were less conclusive than those of Fig. 5, but the results were usually of greater magnitude than those of barren anomalies. In spite of some anomalous results the distribution of the metals, as shown by this technique, reflects a relationship to mineralization channels. It was observed that usually there was only a limited transgression of the beds by the solution depositing the metals. This conclusion is substantiated by the habit of the ore itself. The significant reactions frequently extended farther in the footwall than the hanging wall. In contrast to the limited transgression of the beds, the solutions left significant amounts at considerable distances from ore in the projected plane of the vein. This plane is probably coincident with a sheer zone thought to have played an important part in localizing the ore.

Comparison of geochemical tests over barren areas with those over ore indicate that significance is imparted to high "total content" by the presence of high zinc or copper or both.

Geochemical work at Ducktown indicates that rapid techniques will yield consistent results that may be utilized to detect mineralization channels and thus contribute another factor to help the geologist find ore.

Geochemical Prospecting in the Mississippi Valley

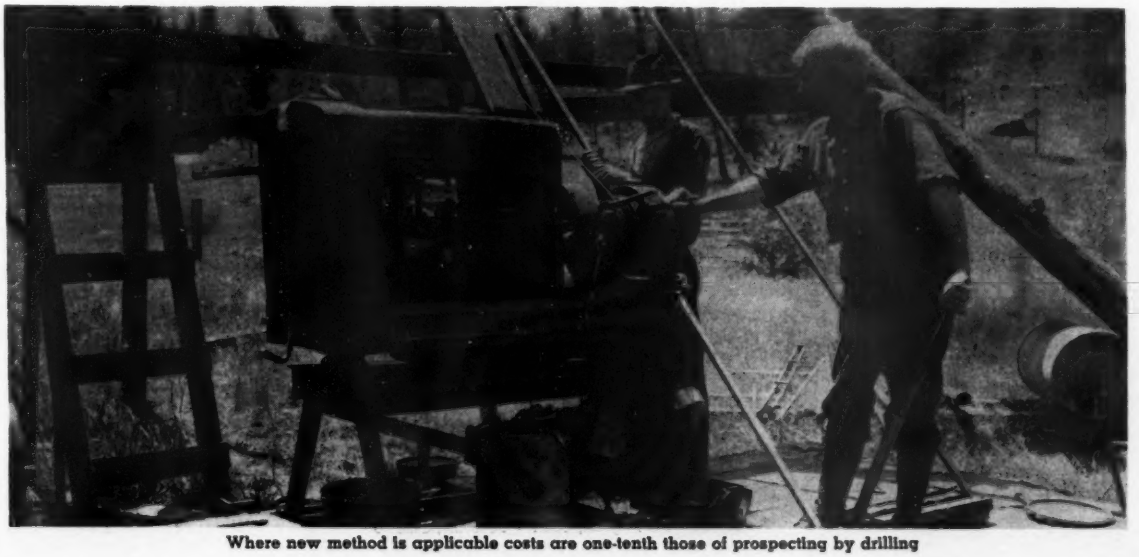
By GEORGE M. FOWLER
Consulting Geologist
Joplin, Mo.

THROUGH the years, various methods have been employed to try to find new ore bodies. Exploration for ore bodies has been carried on in the Mississippi Valley by drilling on one-fourth to one-half mile centers at a cost of $5000 per square mile. Less costly methods would greatly extend the area that could be economically prospected.

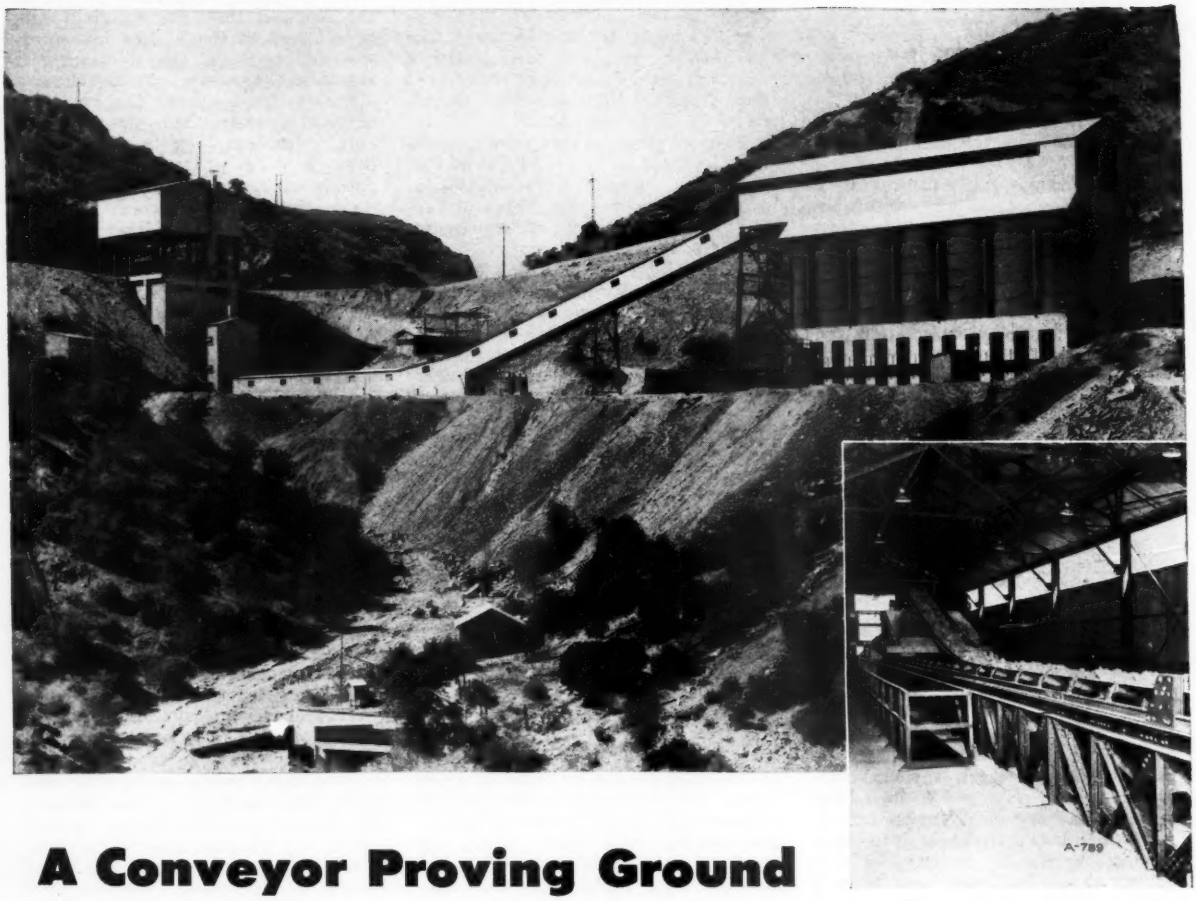
Tri-State ore bodies are confined to small centers of intense structural deformation within an area of 2000 miles. Soil analysis was first tried in areas already known from drilling and geophysical survey data. When the results of geophysical and geochemical methods were found to check fairly closely, the geochemical method was used in unknown areas.

One small ore body of about 50,000 tons was found by this method. Geochemical prospecting results eliminated many square miles that apparently contained only small and scattered ore bodies. Also, this method located and helped in defining faults, shear zones, and other evidence of premineral deformation that are now concealed by surface soils which are from a few inches to 10 ft or more in thickness. The results were shown by the use of contours based on the relative amounts of the several trace elements that were present.

In the period from 1940 to the end of October, 1941, some 11,741 separate samples were taken and analyzed. On the basis of this work it was found that lead, gallium, nickel, cobalt, and tin gave the best results. It cost between 75 and 80 cents per sample at the time; now the cost would probably be about $1.00 a sample. The geochemical method costs from $200 to $500 per square mile as compared with costs of $2000 to $5000 per square mile when drilling methods are used.



Where new method is applicable costs are one-tenth those of prospecting by drilling



A Conveyor Proving Ground

. . . WHERE ONLY THE BEST SURVIVE

Dependable equipment for a heavy duty job. . . . That's the important requirement at this Arizona copper mine. S-A AMSCO manganese steel pan feeder and husky S-A belt conveyor with traveling tripper convey crushed ore to storage bins at a rate of 700 T.P.H. . . . day after day, year after year . . . at lowest cost per ton.

Many of the world's largest producers of metallic ores are depending on rugged S-A conveying machinery for all phases of handling. If you are considering a new conveyor system or an addition to your present equipment, remember the S-A line is backed by 50 years of experience with bulk handling problems.

For any type of conveying system, large or small, get the recommendations of S-A engineers. Write us today . . . no obligation of course.

INSPIRATION CONSOLIDATED COPPER CO.
INSPIRATION, ARIZONA

Copper ore, hauled by trucks from the open pit, is dumped at the road-level station (shown at left of large photo). Ore falls directly into a gyratory crusher which reduces it to 6-inch lumps. Crushed ore drops through a concrete-lined surge bin to the 48"-wide pans of an S-A AMSCO manganese steel pan feeder at the bottom of the bin—62 feet below the crusher. A 36" S-A belt conveyor conveys the crushed ore horizontally and on an incline—at an average rate of 700 tons an hour—to the top of a series of cylindrical storage bins with a capacity of 5000 tons. An S-A traveling tripper, operating above the bins, discharges ore into any designated bin. Air-operated gates under the bins load ore into rail cars.

STEPHEN S-A DAMSON MFG. CO.

52 Ridgeway Avenue, Aurora, Illinois • Los Angeles, Calif. • Belleville, Ontario

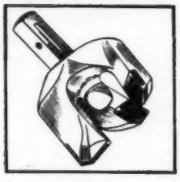
DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

Rotary Bit Drills 4500′ In Potash Ore

Satisfactory results are reported in the rotary drilling of hard potash ore in southeastern New Mexico, as 4500 feet of drilling is being obtained in langbenite per average bit life. Jeffrey A-6 Drills equipped with Kennametal Tungsten Carbide Insert Rotary Bits, 1½" in diameter, are used.

•

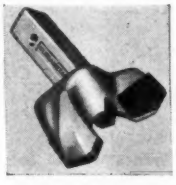
Iron Ore Rotary Drilled



In one operation in Minnesota, an unusual use of Kennametal Tungsten Carbide Rotary Drill Bits is being made to drill in the overburden in recovering low grade ore. The boring is done horizontally. Speed and mobility over the churn drilling method are the advantages reported.

•

108′ Holes In Gypsum Drilled By Rotary Bit



A large gypsum mine operator in Virginia reports that holes are now being drilled successfully to a depth of 108 feet by the use of rotary auger-type equipment, supplementing core drilling equipment for long hole drilling. Advantages are: Speed, freedom from water and dust, easy mobility. Kennametal 1⅞" Tungsten Carbide Bits and scroll-type auger are used.

•

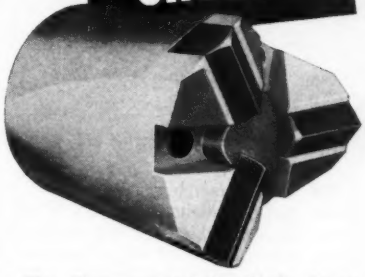
Structural Bit Gives Big Ore Samples

A six-point "Chopping Bit" used on the Mesabi Range to determine quality of formation is reported to cut cost 50% to 70% in two instances where it has been used. A big feature is that it produces large, easy-to-analyze chunks of ore. It is set with 6 Kennametal Tungsten Carbide Inserts.

Kennametal Rock Bits DRILL FASTER

in AVERAGE GROUND

in HARD GROUND



The Kennametal Multiple-Point Rock Bit offers 10% to 12% faster drilling speeds under average conditions due to its "3-point" construction and exceptional clearance for cuttings.

Single blade construction enables the Kennametal "Chisel-Type" Bit to give faster drilling speed, longer service life in hard, solid, abrasive rock.

After more years of experience than any other American manufacturer in the development of tungsten carbide rock bits, Kennametal has produced these modern bit designs that put the emphasis on drilling speed.

"Three-point" construction is offered in the Kennametal multiple-point bit to give additional drilling speed (10% or more in many cases) where the use of multiple-point bits are necessary. Where conditions permit, such as in solid hard drilling, the chisel-type bit gives still higher rates of penetration.

Kennametal Bits offer long life because they feature inserts of Kennametal tungsten carbide, the carbide used in more mining bits than any other carbide in the world.

Special construction features are: Good clearance for free removal of cuttings; easy reconditioning.

For dependable low cost results, use Kennametal "Insert-Type" Rock Bits.

Detailed information on request by writing: Kennametal Inc., Latrobe, Pa.

KENNAMETAL inserts make the BIG difference

Kennametal inserts make the BIG difference in every drilling job as they feature long wear and high resistance to shock. They are produced according to special Kennametal processes that differ from any others in the world. They are dependably more uniform in quality. Kennametal's Nevada Scheelite Mine produces much of the tungsten used in their manufacture.

KENNAMETAL®

BITS FOR ROTARY AND PNEUMATIC DRILLING IN METAL AND NON-METALLIC MINERAL MINES

ROCK BITS • DRAG BITS • CORE BITS • DRILL BITS FOR SPECIAL JOBS

With the *Defense Agencies*

DURING the past month, top defense officials, including Defense Mobilizer Charles E. Wilson and Defense Production Administrator Manly Fleischmann, have expressed cautious optimism over progress of the over-all mobilization program.

These officials are reporting that: (1) while the defense program is slightly behind schedule it will forge ahead in the next few months as some key "bottlenecks" are broken; (2) major problems are shortages of nonferrous metals and alloys, and machine tools, but they expect these to be overcome by 1953; (3) there is no prospect of shortages in consumer hard goods through 1952, due to heavy inventories of these commodities; (4) defense spending is on the increase and is expected to rise to 18 or 19 percent of the total national production for next year.

One reason for this cautious optimism is the return to normal of nonferrous metal production following the issuance of a Taft-Hartley injunction ordering striking miners back to work.

However, a dark cloud hovers over the horizon with respect to steel production. A serious shortage of steel scrap threatens to slow down what Mobilizer Wilson terms the "king" of the mobilization effort. A vigorous campaign has been initiated to get scrap flowing to the mills, to meet the objective of 36 million tons of scrap which is needed by the steel industry to attain expanded production goals.

Mining Program Advances

On the minerals front, the newly created Defense Materials Procurement Agency is beginning to show signs of activity. Jess Larson has been sworn in as head of the new agency and his first act in assuming that post was to name Howard I. Young, president of American Zinc, Lead and Smelting Company, St. Louis, and president, American Mining Congress, as deputy administrator. Young has had broad experience with mobilization problems, having served with the War Production Board in World War II in various posts, culminating with the job of Deputy WPB Vice-Chairman for Metals and Minerals.

For the time being, Larson has turned over to the agencies that previously handled them, the powers pertaining to mineral and metal production provided in the Defense Production Act. This action was taken pending the establishment of a complete organization within the DMPA.

In assuming his post, Larson emphasized that everything possible will be done to assure stability of the domestic mining industry, but declared that development of additional sources of supply in which we are deficient will be pushed in foreign countries.

Some members of Congress have expressed disapproval of the President's Executive Order establishing DMPA, declaring that it failed to give to that agency the authority to make final decisions as to the granting of mine loans. It is understood that this matter is being studied by presidential advisors.

DMPA is attempting to remove the road-blocks that previously existed in negotiating Government purchases of strategic metals and minerals. The agency hopes to be able to speed the arranging of such contracts.

DMPA has also: (1) loaned $60,000 to the North Butte Mining Co. of Montana for the development of added copper production; (2) agreed to purchase 22,500 tons of copper annually from the Copper Cities Mining Co., operating near Miami, Ariz.; (3) contracted for the full three-year output of zinc from Volcan Company, Lima, Peru, and (4) reached an agreement with Phelps Dodge Corp. that will boost copper output by 38,000 tons a year, beginning in late 1954 or early 1955. This latter agreement provides that the company will undertake a $25 million expansion program including construction of a new concentrating and leaching plant and enlargement of its Douglas, Arizona smelter, and that DMPA will purchase, at 22 cents a pound, up to 112,500 tons of the first 150,000 tons produced at the new facilities if the company cannot sell it to other U. S. purchasers at a higher price.

Mineral Exploration Program Accelerated

The Defense Minerals Administration, during August, approved and signed 35 new mineral exploration contracts, involving projects in 14 states and a cost of $1,687,887. During the first two weeks in September the agency approved contracts for an additional 16 exploration projects for strategic metals and minerals in nine states and Alaska, involving an estimated cost of $564,022.

With the signing of these contracts the number approved since the inauguration of the mineral exploration program now totals 144 involving expenditure of $8,578,868, of which the Government's share is slightly over $5,000,000.

The exploration contracts call for searches for commercial deposits of lead, zinc, copper, mica, beryl, monazite, sulphur, uranium, tungsten, mercury, antimony, manganese, columbite, tantalum, nickel, cobalt, and asbestos.

Meanwhile, DMA has announced that it will not receive any more applications for loans, tax amortization certificates, or other forms of Government aid from producers of limestone, fluxstone, dolomite, caustic lime, hydrated lime, magnesite, periclase, and magnesium oxide. The

(*Continued on page* 105)

"Repeated Use" Reduces Bonding Costs

Bonds that do their job over and over again are saving money with each new installation, and in these days, they are helping tremendously to make the operator's stock of bonds go further. Easy reclaimability of every O-B Wedge Bond is enabling many operators to cash in now on the "Repeated Use" feature of this bond.

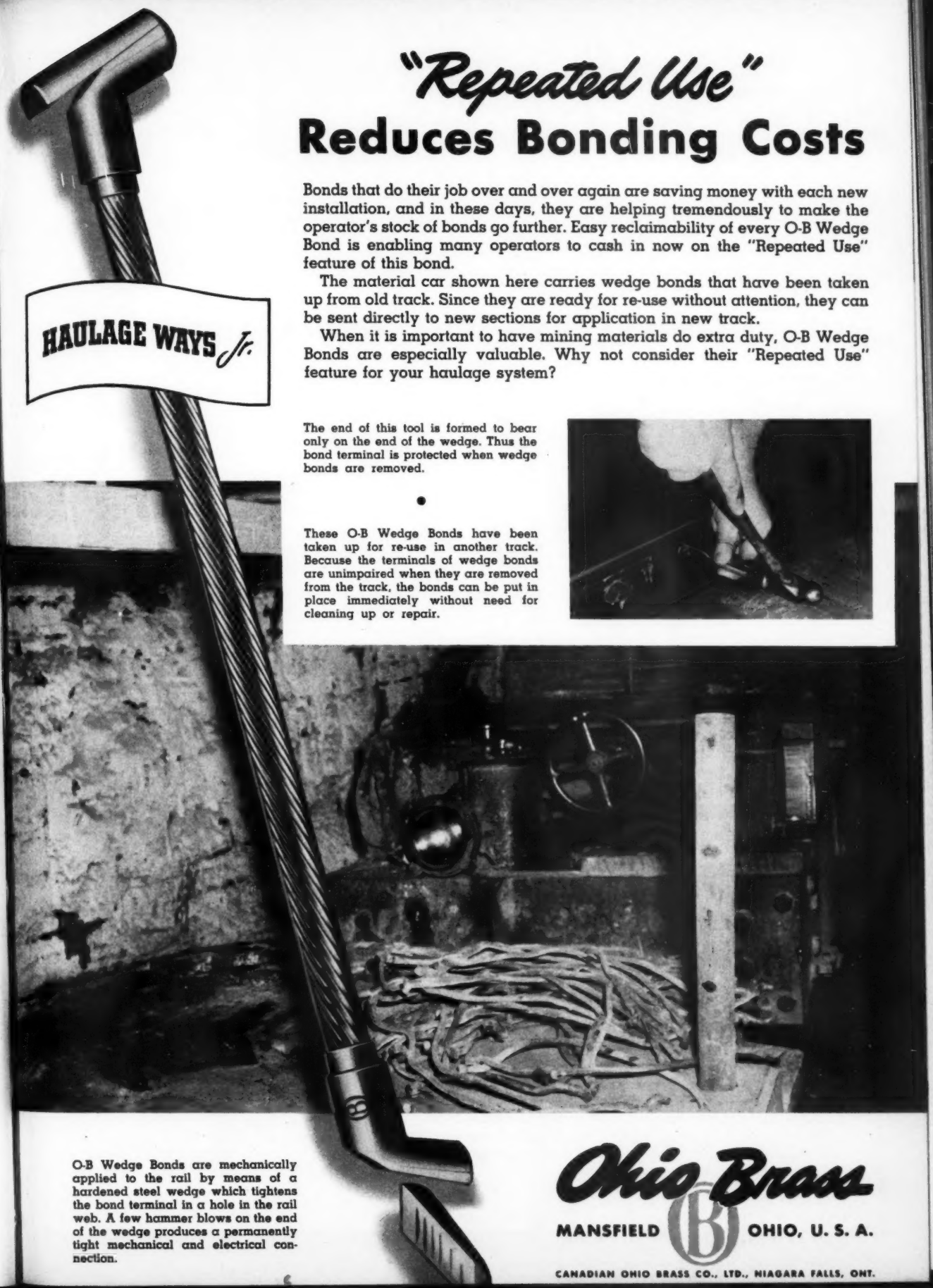
The material car shown here carries wedge bonds that have been taken up from old track. Since they are ready for re-use without attention, they can be sent directly to new sections for application in new track.

When it is important to have mining materials do extra duty, O-B Wedge Bonds are especially valuable. Why not consider their "Repeated Use" feature for your haulage system?

The end of this tool is formed to bear only on the end of the wedge. Thus the bond terminal is protected when wedge bonds are removed.

•

These O-B Wedge Bonds have been taken up for re-use in another track. Because the terminals of wedge bonds are unimpaired when they are removed from the track, the bonds can be put in place immediately without need for cleaning up or repair.



O-B Wedge Bonds are mechanically applied to the rail by means of a hardened steel wedge which tightens the bond terminal in a hole in the rail web. A few hammer blows on the end of the wedge produces a permanently tight mechanical and electrical connection.

Ohio Brass

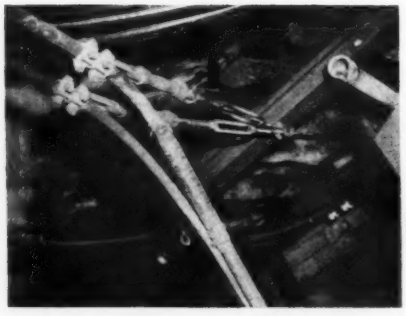
MANSFIELD OHIO, U. S. A.

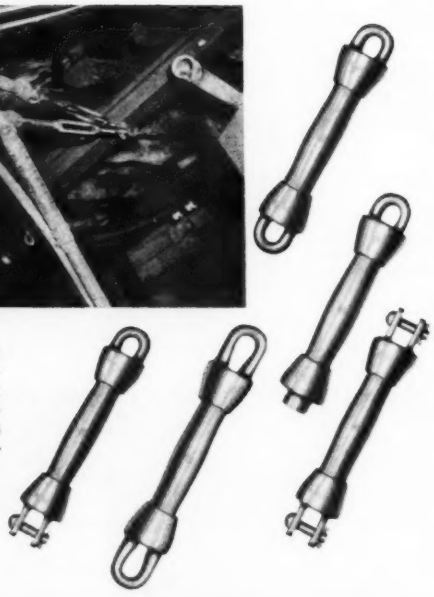
CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

HAULAGE WAYS *Jr.*

How to End Dead-End Problems

For Heavy Cables—A Heavy Strain—Holding Assembly





Five styles of O-B Wood Strain Insulators provide a number of end fittings for various attachment methods.

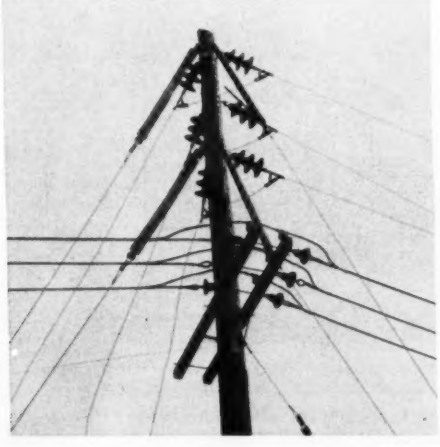
Here's a really rugged strain insulator assembly. Holding heavy feeder cables at dead-ends and strain-holding points with a minimum of sag requires high tensile strength in the cable-holding assembly. This installation gets it with O-B Wood Strain Insulators. In addition to the strength required here, the insulators provide good electrical protection. The long wood body, impregnated with an insulating compound, creates a long leakage path and provides adequate protection against sparkover between the conductor and the support. O-B Mechanical Feeder Wire Strain Clamps and O-B Insulated Turnbuckles complete the strain assembly.

It is interesting to note that the wood insulators are equally effective both in compression and under tension.

O-B HARDWARE AND INSULATORS FOR OUTSIDE DEAD-ENDS, TOO

There are plenty of places on the outside that require a sturdy dead-end or strain-holder. See how the job was done on an outside power distribution system. O-B Suspension Insulators and O-B Strain Clamps did a neat job of handling a number of conductors in a rather congested area.

O-B Suspension Insulators and Strain Clamps are shown in the O-B Insulator Catalog No. 26. If you don't have one in your files, ask your O-B representative for further information regarding them.



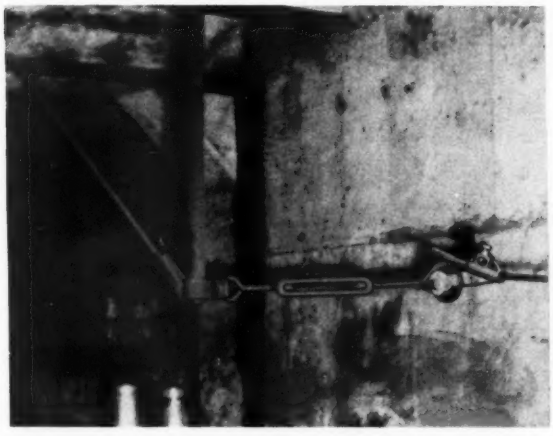
● Dead-ending and strain-holding assemblies needn't be problems when you have the proper fittings on hand, designed to do the job. Take a look at the arrangements shown on these pages – see how well standard O-B fittings have been used in a number of different cases.

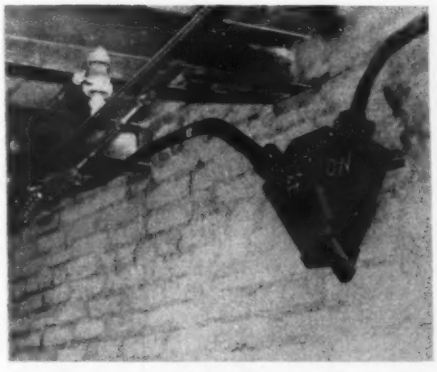
Other O-B fittings for this sort of work are shown in your O-B Mining Catalog; from them you can select a group of clamps, insulators and turnbuckles to handle any of your situations. No more need to improvise when they're in your stock room, ready for use.

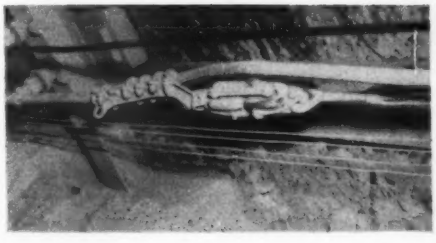
Relieve Strain at Switch Connections

Another popular strain-holding method uses O-B Porcelain Insulators for electrical protection. Shown here in use with O-B Feeder Strain Clamps and O-B Insulated Turnbuckles, the entire assembly is used to bring a slack cable end up to a feeder switch.

A closer view of a similar set-up shows the three parts more clearly. Porcelain insulators offered by Ohio Brass Company for this purpose have tensile strengths ranging from 10,000 to 20,000 pounds with dry flashover ratings from 25 to 35 kilovolts. Corresponding wet flashover values range from 14 to 18 kilovolts.







At the End of the Line . . .

At the end of every trolley overhead some provision must be made to hold the wire taut and tightly anchored. Here the job was done simply and effectively with an O-B Dead-End Cam Grip and an O-B Insulated Turnbuckle. A set screw in the grip acts on a cam with teeth that lock the trolley wire, holding it securely. The trolley wire is not kinked, and extensions are easily added to the free wire end.

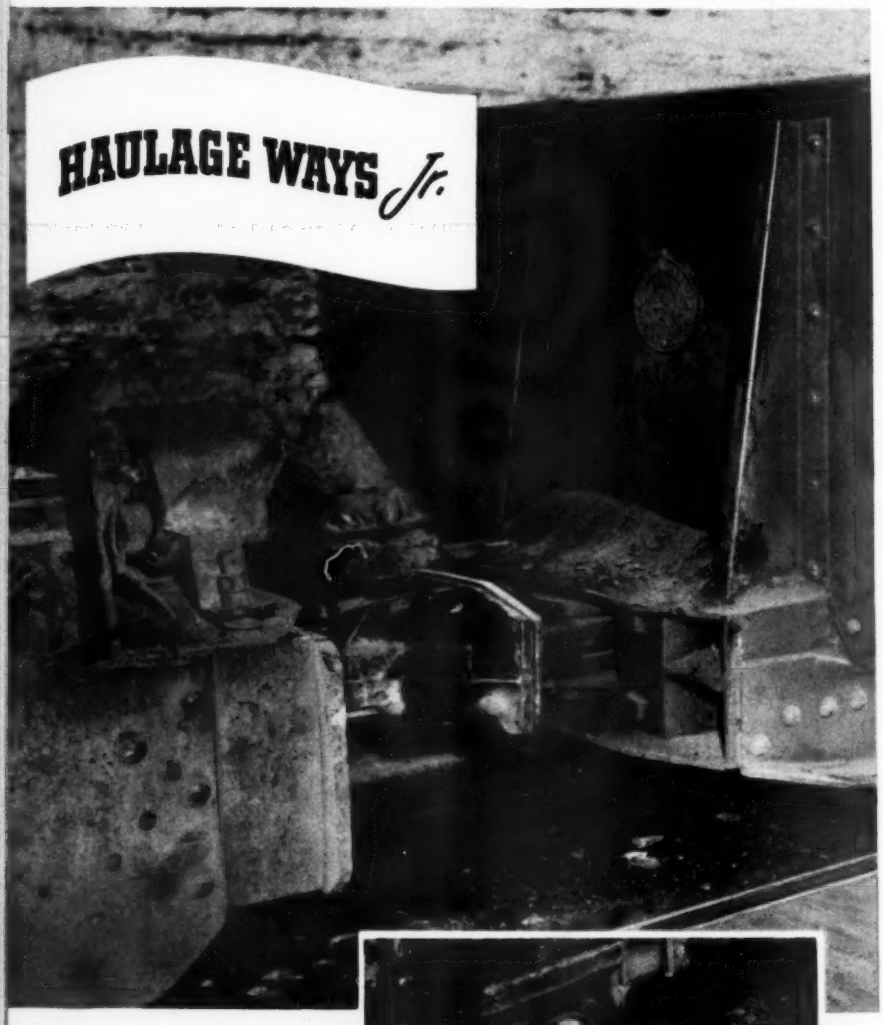
See your O-B Mining Catalog No. 27, pages 49 through 54 for other dead-ending and strain-holding devices. They'll put an end to your dead-ending problems!

Ohio Brass

MANSFIELD OHIO, U. S. A.

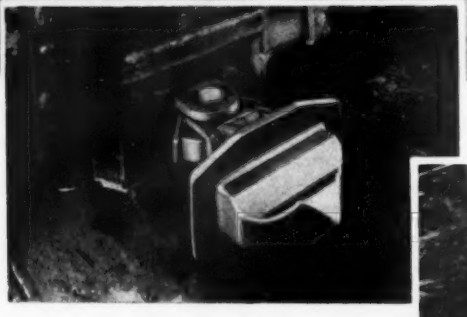
CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

Swift, sure coupling without using hands!



The practice of coupling moving cars, recently cited as one of the major unsafe practices contributing to haulage facilities, has been eliminated on many properties by replacing out-moded link-and-pin hitchings with O-B Automatic Mine Car Couplers. Cars equipped with these couplers join swiftly – securely – on impact, without need of guidance by a workman. Uncoupling cars is accomplished by raising a lever located on the side of the mine car. With the need for entering the between-cars danger zone no longer present, an unsafe practice no longer exists wherever cars have been equipped with O-B Automatic Mine Car Couplers.

Swift, sure coupling – and uncoupling – without the use of hands is a safety feature worthy of your consideration. Be sure to include O-B couplers in your plans for the remodeling of old cars or when new cars are needed.



Gathering locomotive couples with mine cars automatically. No guidance is needed to bring mating heads together, and they couple securely without attention. Motorman uncouples car without leaving his seat!

Mating heads of the O-B Automatic Mine Car Couplers are designed to guide one another as they come in contact. Pyramid shapes cause the heads to seat themselves, rather than to jacknife, or sway to opposite sides of the car centerline.

Ohio Brass

MANSFIELD OHIO, U. S. A.

CANADIAN OHIO BRASS CO. LTD. NIAGARA FALLS, ONT.

THE NEW NAME TO RELY ON

FOR Safe, Sure Shot Firing Cord...

HAZARD REDSHOT* TYPE RG

*Hazard Redshot is the only shot firing cord made in the easy-to-separate, round, parallel form.

Cross section Actual size

Examine it in every detail and you'll find Hazard Redshot has everything you need and want in shot firing cord. It's service-designed and precision manufactured especially for safe, sure blasting in coal mining operations.

Insulation and sheath are combined in one single compound—tough, strong Hazaprene—proved beyond question for its durability in severe service. A uniformly thick, double wall of Hazaprene separates the parallel laid conductors, prevents shorting. This Hazard construction eliminates fibrous fillers which can absorb and retain damaging moisture...reduces conductor resistance...prevents "kinking" of cord in use...provides extra flexibility for easy coiling and uncoiling.

You'll also like the bright red color of Redshot which makes it highly visible; the grooved insulation for easy separation at connections; the quick way it strips clean for easy splicing. Hazard Redshot Type RG Shot Firing Cord fully meets the flame-resistant requirements of U. S. Bureau of Mines and Pennsylvania Department of Mines. For free sample of new Hazard Shot Firing Cord, mail the coupon below today. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD INSULATED WIRE WORKS
Wilkes-Barre, Pa.

Gentlemen:

Please send me a free sample of the new Hazard Redshot Type RG Shot Firing Cord.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

8678

HAZARD insulated wires and cables for every mining use

Steel

BULWARK OF FREEDOM, AND . . .

MORE steel—100 tons more steel every 5 hours. That is what the new electric furnace, pictured at the right, added in August to your at-home steel-making capacity.

Still another of these new, fast steel-making furnaces will be operating at year's end to double this capacity increase. Another blooming mill and auxiliary equipment will also be completed at Sheffield mills.

Yes Sheffield is doing more than its share to enable America to continue to use twice as much steel as all the rest of the world and keep on forging the highest level of better living the world has ever known.

In the past 10 years Sheffield has more than doubled your at-home steel-making capacity. In the same period of time, the steel industry as a whole has increased about one-fourth.

West of the Mississippi and East of the Rockies—Sheffield's primary trade territory—steel-making capacity is looming larger and larger, to meet your needs and make a larger contribution to the industrial growth of the region.

SHEFFIELD STEEL CORPORATION
HOUSTON KANSAS CITY TULSA
SUBSIDIARY OF ARMCO STEEL CORPORATION

SHEFFIELD MOLY-COP T. M.
COPPER-MOLYBDENUM ALLOY
Grinding Balls

USED and PROVED ALL AROUND THE WORLD

IRON AND STEEL *SCRAP* MEANS . . . . . .

MORE STEEL FOR AMERICA
More Money In Your Pocket!

GET YOURS OFF TO
THE DEFENSE LINES NOW!

The ONLY Completely Mobile Loader with these

2 Exclusive Features

ONE MOTOR
does the whole
power job

RUBBER TIRES add new mobility

The CLARKSON Type 28FA Universal *Redbird*

Never before has an automatic loader offered such simplicity of operation. The Clarkson operator easily handles *all* controls hydraulically from one central point . . . just one 50 H. P. motor powers the entire loader. No troublesome differential . . . front and rear conveyors and front head provide new flexibility for those hard-to-reach places. Write for the complete facts today.

The CLARKSON MANUFACTURING CO.
Nashville
Illinois

Wheels of GOVERNMENT

As Viewed by A. W. DICKINSON of the American Mining Congress

PROLONGED Senate debate on the Revenue Bill has again delayed the adjournment of Congress until mid-October or even later. Administration leaders are continuing to press for early action on Defense Production Act amendments, increased postal rates, further expansion of the foreign aid program and additional pay for Federal employees.

Tax Bill

Senate debate opened on the Revenue Bill September 19, following an extensive rewriting of the House-approved measure by the Finance Committee. Opposition to the Committee's $5.5 billion bill by Administration supporters seeking to add $4.5 billion has delayed final action by at least a week. Many of the amendments thus offered would do immeasurable harm to provisions of the bill and of current law which are extremely important to the mining industry. At this writing, however, all of these proposals have been defeated by substantial vote margins, evidencing the confidence of the Senate in the work of its able Finance Committee.

As reported by the Finance Committee the individual income tax would be upped 11 percent over present tax liability, or by a special 8 percent levy on the taxpayer's surtax net income after deducting present taxes. This would be effective November 1.

The corporate rate provision, retroactive to April 1, 1951, would increase the normal tax from 25 percent to 27 percent and the surtax rate from 22 percent to 25 percent. The bill would place a 17 percent ceiling on the amount that could be taken in excess profits and consolidated returns taxes; this added to the 52 percent combined corporate normal and surtax rate would make an effective over-all tax ceiling for corporations of 69 percent.

Of great interest to mining is the Senate version on the expansing of development costs. Section 309 of the bill provides that expenditures incurred in the development of a mine are automatically deductible against other income in the year incurred or, at the election of the taxpayer, may be deferred and deducted ratably as the ore or mineral is sold. Such an election could be made for each year, but must be for the total amount of development expenditures, or the excess over net receipts, with respect to each mine or deposit.

The Finance Committee's report explains that under existing law all expenditures in excess of net receipts from ores or minerals sold are required to be charged to capital account while a mine is in the development stage and are to be recovered through depletion. However, the report continues, after a mine has reached the producing status, development costs whether or not in excess of net receipts from ores or minerals sold, are not treated as capital charges recoverable through depletion but as operating expenses deductible in the year in which the produced ores or minerals benefited thereby are sold. Further comment in the report states: "The requirement that development expenditures must be capitalized presents a serious obstacle to expansion in the mining industry. This is especially serious at the present time because of the shortage of many essential minerals and the desirability of major developments in the case of certain minerals such as iron which are necessary to the defense effort. It is believed that the expenditures for the development of a mine . . . those incurred after the existence of ore or minerals in commercially marketable quantities has been disclosed . . . are essentially similar to those incurred after the production stage has been reached, and, like those, should be treated as expenses relating to the production of the ore or minerals."

In Section 341 of the bill the Committee has also provided special incentive for increased exploration for mineral deposits. The new section specifies that prospecting and exploration costs, up to $75,000 per year in any four years, may be charged as an expense, to be deducted currently or on a deferred basis. This $75,000 limitation is an over-all figure on all such expenditures by the taxpayer. It is not applicable separately to each mine or deposit.

With reference to this exploration amendment the Committee report explains: "Under present law, expenditures for ascertaining the location, extent, and quality of mineral deposits cannot be deducted (unless such expenditures produced no useful results, in which case they can be deducted as with any other law), but must be capitalized. Amount so capitalized can be recovered for tax purposes only through depletion allowances. Moreover, if the depletion allowance is based upon a percentage of gross income from the property, this deduction is the same whether a large or a small sum was spent for exploration, so there is no special tax incentive for increased exploration expenditures."

Under the excess output provision

★ ★ ★ ★ ★ ★ ★

Washington Highlights

CONGRESS: Adjournment delayed.

TAX: Administration criticizes Senate bill.

DMPA: Howard I. Young, deputy administrator.

PRICE CONTROL: Amendment pending.

STOCKPILES: Copper and zinc withdrawals.

CHROME: Purchase depot established.

SCRAP: Urgently needed.

★ ★ ★ ★ ★ ★ ★

of the excess profits tax law (Section 453(b), (2) and (4)), the Committee has granted to sulphur, potash, chemical and metallurgical grade limestone the same treatment as is not accorded to coal and metal mines. This would provide an alternative method for computing non-taxable income from exempt excess output, under which one-half of the unit net income on all production in excess of the average base period production is excluded from excess profits tax. If the mine was not in production, or was operated at an over-all loss during the base period, one-third of its net income would be excluded from excess profits tax.

Under Section 325 the bill provides capital gains tax treatment, instead of the higher ordinary income tax rates, to income received from coal royalties. The bill is specific in that the new provision will in no way change the tax treatment now afforded to royalties paid by a lessee.

In its consideration of percentage depletion the Committee has confirmed the House action in increasing the allowance for coal from 5 to 10 percent. The bill would extend percentage depletion at 10 percent of the gross income from the property (but not to exceed 50 percent of net income) to coal, asbestos, brucite, dolomite, magnesite, wollastonite, borax, Fuller's earth, tripoli, refractory and fire clay, quartzite, perlite, diatomaceous earth, metallurgical grade limestone, and chemical grade limestone. A 5 percent allowance is specified for sand, gravel, slate, stone (including pumice and scoria), brick and tile clay, shale, oyster shell, clam shell, granite, marble, sodium chloride, and, if from brine wells, calcium chloride, magnesium chloride, potassium chloride, and bromine.

Aplite, a variety of feldspar, was granted an allowance of 15 percent.

Defense Materials Procurement Agency

Confirmed by the Senate on September 13, Jess Larson took the oath of office the following day as Defense Materials Procurement Administrator. He immediately appointed Howard I. Young of St. Louis as his Deputy Administrator (see further details on page 85).

Price Control

The unhappiness in Administration quarters over the Capehart amendment to the Defense Production Act has resulted in extended hearings and much controversy before the Senate Committee on Banking and Currency. As discussed last month, the Capehart amendment permits manufacturers and processors to pass on increased costs, both direct and indirect, occurring since the Korean war began.

A revision of the Capehart amendment now reported to the Senate by the Committee makes a substantial reduction in the cost relief available to manufacturers. It would require the Office of Price Stabilization to grant relief to manufacturers or processors, on an industry-wide basis, for increases in "necessary and unavoidable costs" between January 1, 1950 and July 26, 1951. Such costs would include all labor, material and transportation costs, "and a reasonable allowance as determined by the President" for changes in all other costs such as selling, advertising, office, administration, and distribution costs. As it stands in the present law, the Capehart amendment requires price relief to be based on individual companies and makes it mandatory that OPS include both direct and indirect costs in figuring ceiling prices.

Senator Capehart has stated that the revision of his original amendment makes his original language "meaningless" except in those cases where OPS wants to roll back prices.

Some observers feel that inasmuch as the House does not plan to go further into this legislation until the Senate has acted, the result will be no further enactment and the Capehart amendment will stand as it is in the existing law.

Stockpiles

Added to the White House authorization to release 25,000 tons of copper from the national stockpile for defense needs, are reports that the National Production Administration has recommended that 25,000 tons of zinc also be released and allocated to consumers. It is also indicated in reports that zinc which was to be delivered to the stockpile during the third quarter is currently being allocated to consumers. It is understood that smelters which are handling Government-owned zinc concentrates are still required to deliver the metal to the stockpile.

A bill has been introduced by Rep. Patterson (Rep., Conn.) to suspend the import duty on zinc, zinc compounds and zinc-bearing ores for a period of two years or until the end of the present national emergency, whichever is earlier. As yet the bill includes no provision for a price floor at which the duty would be reimposed. Defense Mobilizer Charles E. Wilson has urged quick enactment of a zinc duty suspension measure.

The bill suspending import duties on lead and lead products until March 31, 1953, is now in the Senate Finance Committee following House passage August 13. This bill carries a proviso under which the President would be required to revoke the suspension of duties whenever the average market price of common lead for any one calendar month falls below 16⅞ cents a pound delivered New York.

There is also a bill pending before the House Committee on Ways and Means to suspend import duties on articles containing more than 50 percent of tungsten and tungsten carbide for a period of two years, or until the termination of the national emergency, whichever is earlier.

Scrap Metal Needed

Defense Mobilizer Charles E. Wilson is vigorously urging everyone to drive hard in getting cast iron, steel and nonferrous scrap into the hands of the scrap dealers and the steel mills. Many mills are now running from day to day and the average supply of steel scrap is less than two weeks. The National Production Administration has established 823 scrap mobilization committees to work with local organizations and every effort is being made to "flush out" dormant scrap to meet defense needs.

It is pointed out that the most effective way to get results is to appoint a scrap committee in every company, headed by an executive, to see that every bit of dormant scrap is routed to normal trade channels promptly and on a continuing basis.

The mining industry needs new steel and other materials for maintenance, repair and operation of its mines as well as for new equipment. It is of extreme importance that this scrap metal be forthcoming—LET US DO OUR PART.

The Complete Report

of the

1951 WESTERN CONVENTION

will appear in the

DECEMBER ISSUE

•

Watch for Your Copy

•

AMERICAN PERMISSIBLE EXPLOSIVES . . . *for any seam of coal*

AMERICAN
CYANAMID COMPANY
EXPLOSIVES

FOR EITHER MECHANICAL OR HAND LOADING

NON-GELATINOUS

Fast	Medium	Slow
American 22	American 11	American 1
American 23	American 12	American 2
	American 12A	American 3A
	American 14A	American 4A
	American A	American 5

GELATINOUS

Permigel A
Permigel B

Blasting Powder . . . . . Granular
Blasting Powder . . . . . Pellet

As a result of intensive research, close chemical control and unremitting care in manufacture, the AMERICAN list of permissibles provides an explosive exactly fitted for the most effective use in any seam —for either hand or mechanical loading. With a complete range of velocities and densities, the list of AMERICAN Explosives includes one exactly suited to *your* blasting requirements.

AMERICAN Explosives have been thoroughly proven through many years of service in representative coal mines. You can *count* on them! And you can count on prompt delivery service, too—from well-located plants and distributing points. Always specify "AMERICAN".

Capable Field Engineers are Available at Your Call

AMERICAN Cyanamid COMPANY
EXPLOSIVES DEPARTMENT
30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

Sales Offices: Pittsburgh, Pa. • Bluefield, W. Va. • Scranton, Pa. • St. Louis, Mo. • Chicago, Ill. • Pottsville, Pa. • Hazleton, Pa. • Maynard, Mass.

★ High Explosives ★ Permissibles ★ Blasting Powder ★ Blasting Accessories

The Coeur d'Alene

(*Continued from page* 58)

pendence Lead Mines Co., Day Mines also acquired a 30-year lease on a production and profit-sharing basis on the Independence and American Commander claims, between the Hunter and Morning mines. Federal Mining and Smelting Co., operating the Morning mine, is interested with the Day Co. Federal has already started to develop the Independence at depth by driving a prospect drift from the 3600-ft level in the Morning workings. This drift will probably be some 5000 ft long. About two miles directly north of the Hunter, Day Co. owns the King group of mining claims consisting of an unbroken string extending from Burke to the Snowstorm mine, east of Mullan. For the development of this group the company has obtained a government loan, the amount of which is to be matched by the company. The logical place to start deep development of this group would be through the lower Hunter tunnel, where a continuation of the present mile-long crosscut for another two miles would gain a depth of approximately 3000 ft.

The third big mining concern to enter the field is the Coronado Copper and Zinc Co. of California. This company has taken over the Moe and Gem State groups just west of Mullan, adjoining the Hecla-Newmont-New Jersey zinc project on the north, and has announced a deep development project to be started as soon as geological surveys have been completed.

The latest company to enter the field is the Silver Valley Lead Co., reputedly sponsored by the Sullivan Mining Co. (Bunker Hill-Hecla subsidiary.) This company consolidates several different mining companies owning 124 unpatented and 11 patented mining claims.

Outlook Bright

Since 1947 production from the mines of the Coeur d'Alene district has more than doubled. Exploration work, as shown above, is being carried on extensively. There is every indication that the search for new ore shoots and extensions of veins, already proven producers, will be crowned with success. The result of all these projects can only be a net increase in the amounts of lead, zinc and silver as well as other metals available to the national economy and this at a time when the nonferrous metals are so vitally needed for the defense mobilization effort.

Well on its way toward its second billions dollars worth of production it is safe to say that the Coeur d'Alene mining district has not yet reached its peak and will continue to serve the nation for many years to come.

WITH
BRONCO 60
Certified
PORTABLE CORD AND CABLE
YOU GET
• MORE NEOPRENE IN THE PROTECTING JACKET! It is Certified to contain not less than 60% by weight of new Neoprene. This ... INCREASES SAFETY MARGIN, INCREASES RESISTANCE, INCREASES SERVICE LIFE!
• LONGER-LASTING COLD RUBBER INSULATION!
• GREATER FLEXIBILITY!—engineered, rope-like flexibility.
• MORE CONVENIENCE! Jackets are branded with full identifying data. Coils are packaged in neat shelf cartons.
Bears symbol "P116BM," flameproof registration number of the U. S. and Pennsylvania Bureaus of Mines.
ELECTRICAL WHOLESALE DISTRIBUTORS
Bronco 60 Certified is an Achievement of
WESTERN INSULATED WIRE CO.
LOS ANGELES 58, CALIFORNIA

POWER *and* SIMPLICITY

are combined in

JEFFREY 35-B SERIES

SHORTWALL CUTTERS

The 35-B illustrated is a continuous duty machine designed and built for tough underground service over long periods with minimum maintenance. Considerable time is saved due to the independent operation of the feed and handling mechanism which permits the machine to be sumped . . and the cut across the face started with one setting of the jacks.

Jeffrey SHORTWALL machines are of simple, rugged design with few, slow moving parts and slow speed motor . . thus providing all the essential requirements for reliable performance, low maintenance and continued economy of operation.

Jeffrey has the experience, the plant facilities and the engineering organization to help you. Consult a Jeffrey engineer for information on the unit best suited for your particular job.

JEFFREY

Drills — Cutters
Locomotives
Shuttle Cars

Mine Conveyors
Loaders — Jigs
Fans and Blowers

THE JEFFREY MANUFACTURING COMPANY

958 North Fourth Street, Columbus 16, Ohio

District Offices

Baltimore 2	Buffalo 2	Denver 2	Houston 2	Philadelphia 3
Beckley, W. Va.	Chicago 1	Detroit 13	Jacksonville 2	Pittsburgh 22
Birmingham 3	Cincinnati 2	Forty Fort, Pa.	Milwaukee 2	Salt Lake City 1
Boston 16	Cleveland 15	Harlan, Ky.	New York 7	St. Louis 1

Jeffrey builds a complete line of Trolley and Storage Battery Locomotives for gathering or haulage. Send for details.

Service Stations

Birmingham—Pittsburgh—Johnstown—Forty Fort, Pa.—Mt. Vernon, Ill.—Harlan, Ky.
In West Virginia: Beckley—Cabin Creek—Logan—Morgantown—Welch

Associated Companies

Jeffrey Mfg. Co., Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Ohio Malleable Iron Co., Columbus, Ohio
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio
Galion (Great Britain) Ltd., Wakefield, England

EVEN IN UPPERS... DU PONT "GELEX" STAYS PUT

Gives you maximum efficiency at lowest cost

Du Pont "Gelex" combines the economy of low-density dynamites with the water resistance, cohesiveness and high strength of gelatins. "Gelex" is highly suitable for a wide variety of ore mining operations, and it's a favorite with mining men everywhere.

IT'S COHESIVE. When you put "Gelex" in uppers, it stays there. That's because it is plastic, cohesive and is supplied in perforated cartridges which eliminate raveling and assure concentration of the charge at the back of the hole . . . where it will do the most good.

IT'S ECONOMICAL. Stick for stick, "Gelex" costs less than gelatins of comparable strength. The excellent water resistance of "Gelex" frequently permits it to be substituted for more expensive gelatin grades.

IT'S EFFICIENT . . . Fragmentation is excellent in hard, soft or intermediate ore. In addition, "Gelex" has very good fumes.

You'll appreciate Du Pont "Gelex" in your operations. It gives you dependable performance and increased economies. Contact the Du Pont Explosives representative in your area. He will be glad to give you complete information and assist you in any way he can. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Del.

Listen to "Cavalcade of America"—Tuesday evenings—NBC

DU PONT EXPLOSIVES

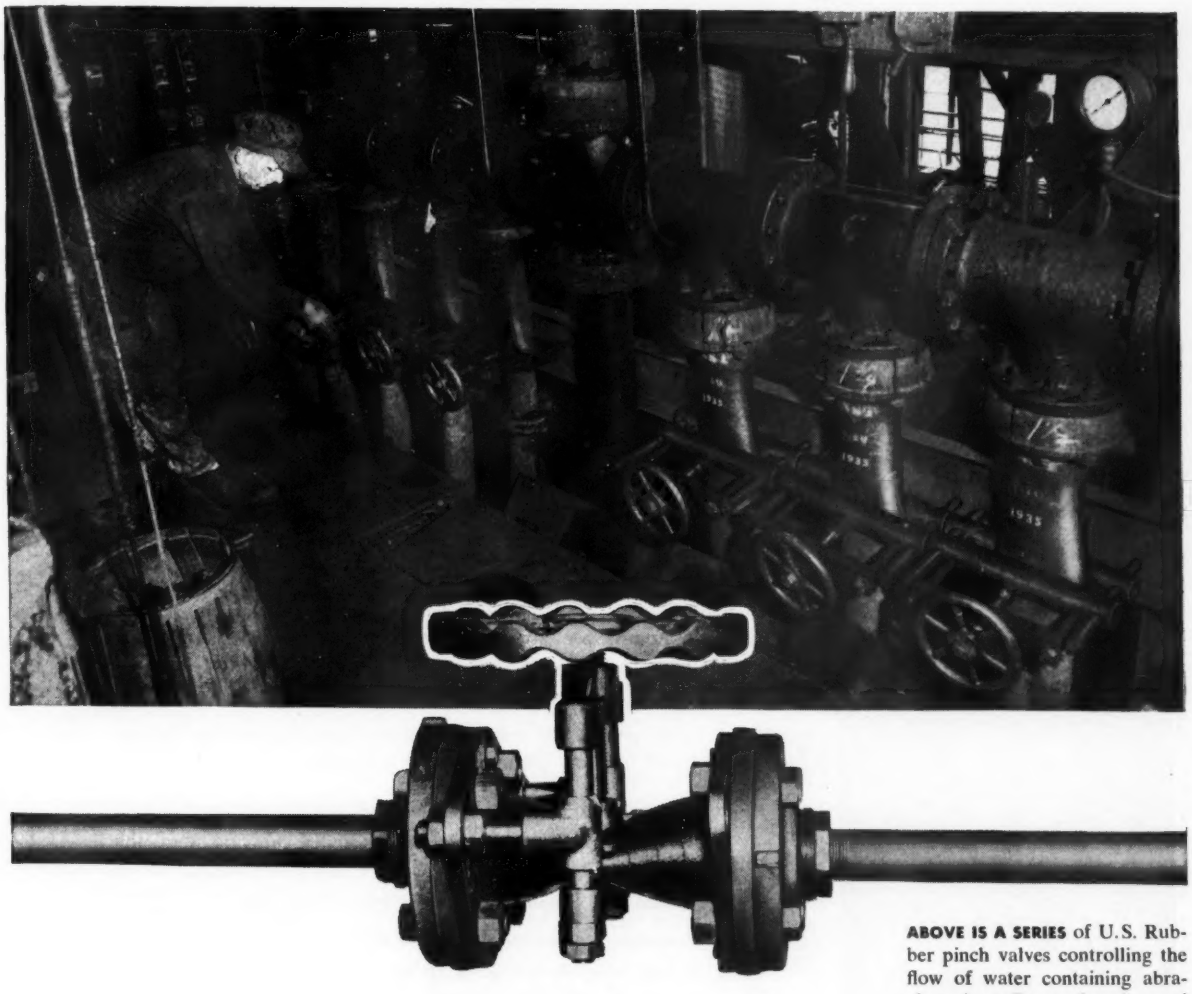
BLASTING SUPPLIES AND ACCESSORIES

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

What does U. S. Rubber's pinch valve do for the coal industry?



ABOVE IS A SERIES of U.S. Rubber pinch valves controlling the flow of water containing abrasives in a Pennsylvania coal preparation plant. Many of them have been in continuous operation for over 16 years. Below the photo is the newest of the U.S. family of pinch valves, shown in a closed position. Sizes range from 1½ inches to 8 inches.

The new "U.S." pinch valve outwears metal when installed in pipe lines carrying abrasive or corrosive mixtures. Its flexibility offsets misalignment in pipes, absorbs vibration, breaks up galvanic action in pipes, eliminates "water hammer" and offers a positive seal in a closed position. The metal parts of the valve can be refitted to new valve bodies, thereby reducing replacement costs.

These valves are also available in neoprene for oil resistance, butyl rubber for high heat and severe acid conditions, and pure gum stock for food and beverage conveyance. Extremely compact design. Write to address below.

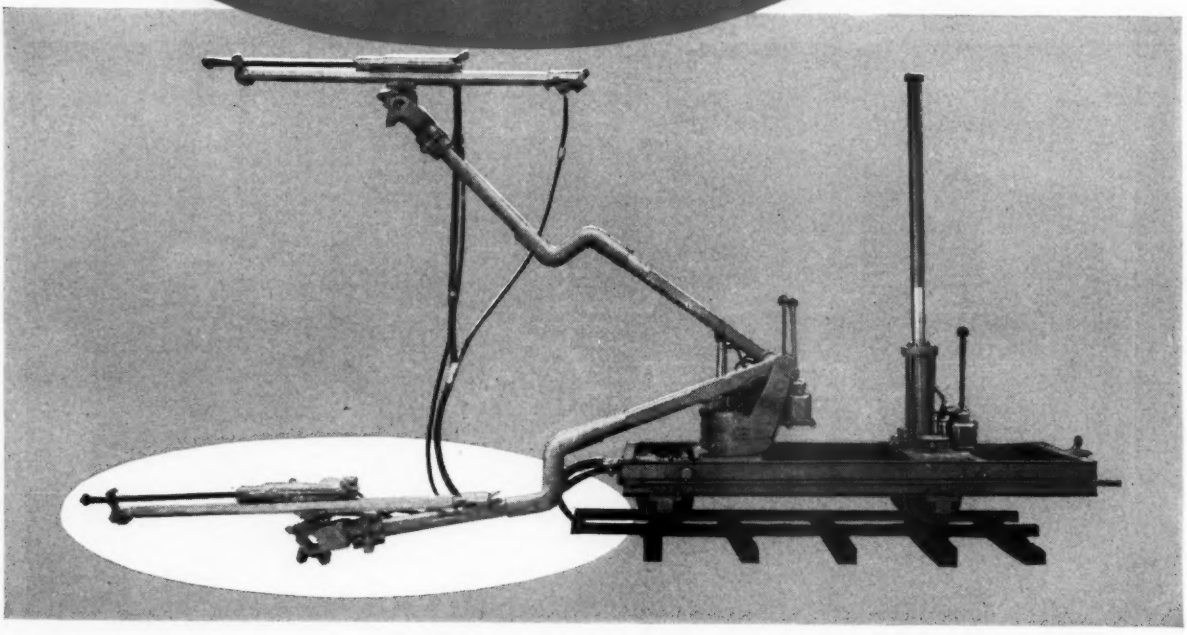
PRODUCT OF U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

GIVE YOUR LIFTERS A LIFT!

Complete truck-mounted units include hydraulic roof jack and either one, two or three drill booms.



Hydraulic boom and roof jack units are available separately for mounting on your own custom-built jumbo.

These offset booms are great time-savers when you're drilling the lifters. Your runner doesn't have to take time out to swing the drill under — steel is easily and quickly centered on *every* hole in the face.

And that's only one of the *many* big advantages of Gardner-Denver Hydraulic Drill Jumbos. Other features include:

- **Faster set-up—move in and start drilling.**
- **Faster tearing down—release hydraulic pressure and the jumbo's off to another heading.**
- **"Creep-free" booms—hold steel steady and true.**
- **Hydraulic roof jacks—hold truck on-the-spot.**
- **Handle long feeds—up to 10-foot steel changes—for efficient use of tungsten carbide bits.**

Write today for complete information.

SINCE 1859

GARDNER-DENVER

THE QUALITY LEADER IN PUMPS, COMPRESSORS AND ROCK DRILLS

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., Toronto, Ontario

AMC Personals

Howard I. Young, president of the American Zinc, Lead and Smelting Co., St. Louis, has been appointed Deputy Administrator of Defense Materials Procurement Administration by Jess Larson, DMPA Administrator. Young, who is also president of AMC, served with WPB during World War II as director of the Mineral Bureau, director of Minerals Resources Coordination Division, and deputy WPB vice-chairman for metals and minerals.

According to a recent announcement by F. V. Lynn, secretary, Pennsylvania Coal Co., **Milton H. Davis** has been appointed sales manager of the organization.

Prof. Edward W. Davis, director of the University of Minnesota mines experiment station has been granted a year's leave of absence from the University to undertake the design and construction of a commercial taconite plant at Babbitt, Minn. for the Reserve Mining Co. He will be assistant to **Robert J. Linney**, manager of operations. **H. H. Wade**, assistant director of the experimental station, will be in charge during the absence of Dr. Davis.

Duncan K. Mackenzie has been elected a vice-president of Castner, Curran & Bullitt, Inc., export coal subsidiary of Eastern Gas and Fuel Associates, it was recently announced at company headquarters in Pittsburgh by Walter Rothenhoefer, vice-president of Castner and general manager of sales for the Eastern Gas coal division.

Mackenzie will be in charge of the New York office and will supervise export sales, a position he has held as assistant to the vice-president. He also is foreign sales manager for the Eastern Gas coal division.

Paul Hett has been elected to the position of vice-president of the Nevada Mines Div., Kennecott Copper Corp. in McGill, Nev. After graduation from the South Dakota School of Mines he worked as mine engineer for the Bald Mountain Mining Co. at Trojan, S. D., and later as sampler for the Nevada Consolidated Copper Co. at Ruth, Nev. He advanced through various supervisory positions of the Nevada Mines division of Kennecott, to general mining superintendent in 1945.

Stuyvesant Peabody, Jr., president, Peabody Coal Co., announced the promotion of **Francis J. Hoyne**, from treasurer to assistant vice-president in charge of sales.

Mr. Hoyne had been with the sales department of the Peabody Coal Company for 15 years prior to spending the last five years in the treasury department.

Jones & Laughlin Ore Co. has transferred **Harold J. Christy** from the Vican iron mine, Wakefield, Mich., to the new Tracy mine at Negaunee, Mich., where he will serve as assistant superintendent.

James S. Anderson, assistant general sales manager of The Babcock & Wilcox Tube Co., has assumed the duties of chief of the newly created tubing section of the iron & steel division of the Industries Operations Bureau of the National Production Authority. His headquarters will be in the offices of NPA in the new General Accounting Office Building, Washington, D. C.

Raymond E. Zimmerman has been appointed chief preparation engineer in the coal division U. S. Steel Co., according to a recent announcement. After graduation from Pennsylvania State College in 1926 he started work as a coal miner with Imperial Coal Corp., Johnstown, Pa. Two years overseas service as lieutenant colonel in ordnance during World War II were followed by employment with Hanna Coal Co., teaching at Penn State and consulting work until 1950. Since then he has been chief coal preparation engineer for Koppers Co.

Oglebay Norton & Co. announced the appointment of **Lancelot Balderson** as assistant vice-president in charge of iron ore operations to aid Frank J. Smith, vice-president. Balderson will continue to devote most of his attention to the mining of taconite ore.

1952 Coal Convention

KENNETH A. SPENCER, president, Pittsburg and Midway Coal Mining Co., has accepted the national chairmanship of the Program Committee for the 1952 Coal Convention which will be held in Cincinnati May 5 to 7. Plans for this meeting are now going forward. The Program Committee, composed of representative operators and equipment manufacturers, will meet in the near future to select subjects and speakers for the sessions.

At the Convention an interesting story will be told. Over the past years modern coal mining has progressed at a rapid pace. New machines and improved equipment, designed for higher efficiency and greater safety, have gone into operation. The industry is prepared to meet almost any demand for its products—but cannot rest on its laurels. To supply the energy and chemical raw materials needed under emergency conditions that may prevail for years, continual alertness to new operating ideas and the seizing of every opportunity to increase efficiency production are a "must" for all coal mining men.

The Program Committee will welcome suggestions for speakers and topics covering all phases of deep and strip mining operations. These may be sent to the American Mining Congress, Ring Building, Washington 6, D. C.

Convention Headquarters will be at the Netherland Plaza Hotel. Reservations should be made as soon as possible direct with this or other hotels, to avoid disappointment. Specify date and type of accommodation preferred.

Cornelius F. Kelley, chairman of the board of Anaconda Copper Mining Co., has accepted the chairmanship of the National Convention Committee of the Thirty-eighth National Foreign Trade Convention to be held at the Waldorf-Astoria Hotel, New York, October 29-31, 1951, it was recently announced by Robert F. Loree, chairman of the National Foreign Trade Council.

The appointment of **Dr. James F. Eversole** as Manager of Research Administration of Union Carbide and Carbon Corp. has been announced by Dr. George O. Curme, Jr., vice-president in charge of research. Dr. Eversole will help coordinate the research activities of all of the Corporation laboratories where basic research and development work is being done on alloys, chemicals, gases, carbons, and plastics.

Charles H. Sondhaus, assistant manager of National Lead Co.'s Pacific Coast Branch, has retired, after 34 years of service. At various times during this period he served as auditor, comptroller, and director of industrial relations in addition to his latest post as assistant manager.

Eastern Gas & Fuel Associates have announced four promotions in the Coal Division's operating staff. **E. B. Taylor** has been promoted from superintendent at Maitland Operation to assistant chief engineer in the engineering department at the Pittsburgh office. **J. S. Wells**, formerly superintendent at Wharton No. 1 Mine, has been appointed general superintendent of the Kopperston, Wharton and Weeksburg mines. **William Laird**, formerly resident engineer at Kopperston Mine, succeeds Wells as superintendent of Wharton No. 1. **J. P. Schwartz** has been appointed superintendent at Maitland Operation.

Election of a new director and two new vice-presidents has been announced by American Cyanamid Co. **E. D. Powers**, vice-president in charge of operations, has been named to the board of directors; and **A. J. Campbell**, general manager of the industrial chemical division, and **Howard Huston**, formerly assistant to the president, have been named vice-presidents. **L. C. Duncan** was elected assistant to the president, **J. J. Murray** and **G. C. Walker**, assistant treasurers, and **J. W. King** and **W. B. Ward**, assistant controllers.

Burdette W. Bellinger, vice-president and general manager, U. S. Phosphoric Products Div., Tennessee Corp., has been transferred to the New York office where he retains his title and position. **L. C. Oakley, Jr.**, has been named manager of production in the company's East Tampa plant.

—*Obituaries*—

Garnett Alfred Joslin, 68, mining engineer, died suddenly in Mexico City September 20. He was born in Fargo, N. D., and educated at Massachusetts Institute of Technology, where he received a degree of B.S. in Mining in 1909.

Mr. Joslin's early work was on examination and management of mines in Cobalt and Porcupine, Ont. He was later superintendent of the Johnnie Mine at Goldfield, Nev., geologist for Caribbean Petroleum Co., Venezuela, followed by examination and operating work in various western states, in Mexico and Chile.

He established a consulting office in Los Angeles in 1927, acting as consultant for Pardners Mines Corp., Pacific Coast Borax Co., Metals Reserve, and many others. He was an associate member of Behre Dolbear and Co., mining engineers and geologists of New York.

From 1943 to 1946 he was a director of the Los Angeles Chamber of Commerce and was chairman of the Southern California section of the American Institute of Mining and Metallurgical Engineers in 1939, and president of the Mining Association of the Southwest 1938-40.

In 1947 he moved to Mexico where he served as manager of Towne Securities Co. until his death.

Ray C. Newhouse, who retired in 1945 as manager and chief engineer of Allis-Chalmers basic industries department, died August 27 at his home in Milwaukee at the age of 76.

Mr. Newhouse, who was retained by Allis-Chalmers in a consulting capacity after his retirement, gained world fame as an engineer, inventor and designer of some of the world's largest cement and mining machinery.

He specialized in crushing and mining engineering, designing many types of crushers, mills, kilns, coolers and dryers. He held nearly 100 United States patents and many foreign patents on machinery and methods for the manufacture of Portland cement.

In 1940 he received the "Modern Pioneer" award from the National Association of Manufacturers in "recognition of distinguished achievement in the field of science and invention."

His affiliations included the American Society of Mechanical Engineers, the Engineers' Society of Milwaukee, and the Society of Professional Engineers.

Karl Ludwig Koelker, mining engineer, Joplin, Mo., died August 15 at the age of 63. Mr. Koelker came to the Tri-State District in 1917, after spending several years in Colorado. A graduate of the Colorado School of Mines, he was long active in mining in this district. His is said to be the best collection of maps and drill logs in the entire area.

John P. Bickell, Canadian mining financier, died recently in New York of a heart attack.

Mr. Bickell began his career in finance at 23, when he opened a brokerage firm. He retired 12 years later to concentrate on his mining properties.

At the time of his death, he was chairman of the board of McIntyre-Porcupine Mines, Ltd., and a director of International Nickel Co., and the Canadian Bank of Commerce.

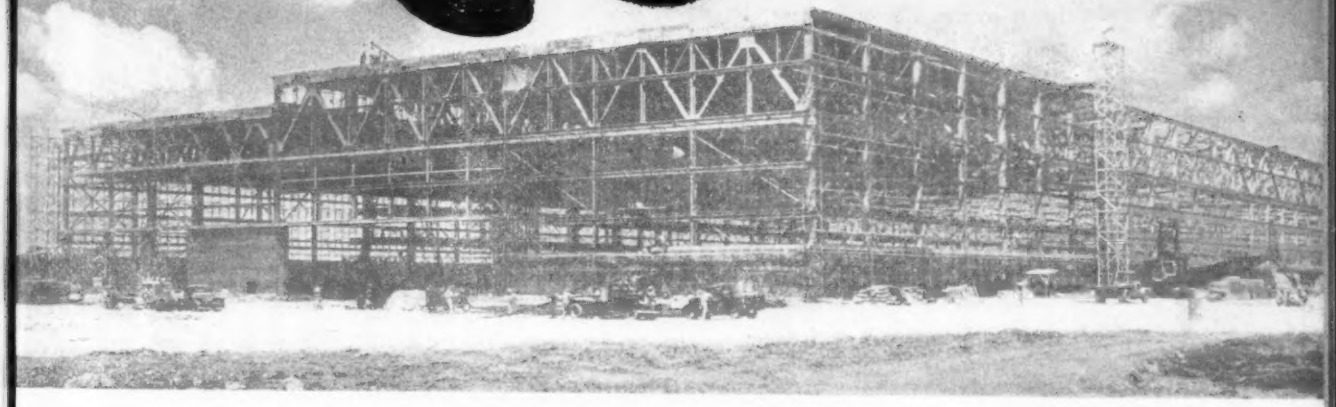
Allison K. Mordue, 68, died recently. Born in Louisville, Ky., Mr. Mordue was a prominent figure in the lake coal trade for many years. He was associated with several coal companies and has served since 1926 as vice-president of the Cleveland, Ohio branch of the Smokeless Fuel Co.

Chester J. Huenefeld passed away in Cincinnati, Ohio. He was 66 years old. Mr. Huenefeld retired from the presidency of the Webb Fuel Co. in Cincinnati last year at which time he became chairman of the board of directors of that company. He had also been president of the Webb Coal Mining Co., Fendale, W. Va.

Claude Garrison Grim, 48, general superintendent and administrator of Pacific Coast Borax Co. at Boron, Calif., died suddenly on September 8. Born at Coggen, Iowa, he was a graduate in mining of Iowa State College. He worked at Morenci, Ariz., for the Phelps Dodge Corp. before and after graduation; for U. S. Potash Co., at Carlsbad, N. M.; for the Climax Molybdenum Co., Climax, Colo.; and finally for Pacific Coast Borax, starting as mine superintendent at Boron in 1939. In 1946 he became general superintendent of the Boron properties of the company and held that position at the time of his death.

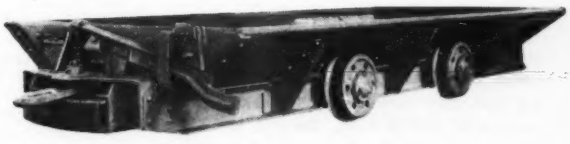
HUNDREDS OF BRAND-NEW FACTORIES DEMAND

MORE COAL



WE BELIEVE you've only had a taste of what the defense effort is going to do to the demand for coal. Defense plants are springing up in every section of the country... hundreds of established plants are being expanded. In the near future you should see a rise in the need for coal such as you have never seen before—and it's due to continue rising for a long time to come!

All of this makes now — *today* — a good time to re-evaluate your coal hauling system. Will it carry far greater tonnages without fear of failure? Is your equipment modern and flexible enough to fit into a long expansion program? If there is any doubt, consider constant haulage mine cars — ***the haulage system that never stops your whole transportation system for repairs.*** Your A.C.F. Sales Representative has the facts—call him in. American Car and Foundry Company, New York • Chicago • St. Louis • Cleveland Philadelphia • Huntington, W. Va. • San Francisco Washington • Berwick, Pa.



a.c.f. MINE CARS

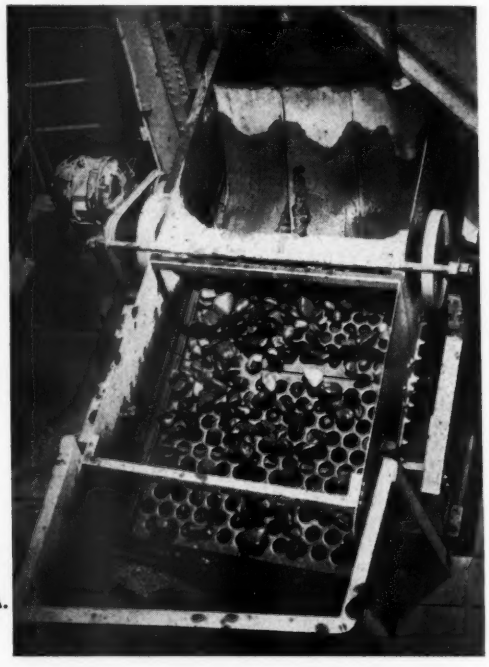
for Constant Haulage

The screen that "can take it"
. . . *and always give good service*

For highly abrasive material, Hendrick Perforated Metal Plate is heat-treated by an exclusive process and maintains uniformity of mesh throughout an unapproached length of service life. That's why it is both most efficient and most economical for vibrating and shaking screens.

The full clearance of Hendrick Perforated Plate minimizes clogging, and the ease with which decks can be changed cuts labor costs. It can be furnished—flat or corrugated—with any desired shape and size of perforations, in proper gauges of tank, high carbon, high tensile, and abrasive-resisting steels, and in other commercially rolled metals.

Write for Hendrick Perforated Plate Catalogue.



1876—Seventy-fifth Anniversary—1951

SEE OUR CATALOG IN SWEET'S

HENDRICK

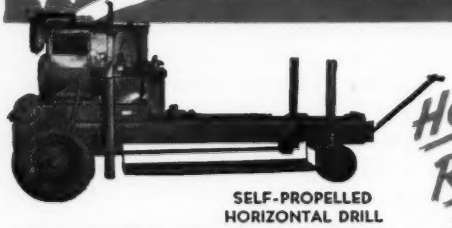
Manufacturing Company

62 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

McCarthy Drills PAY OFF!



SELF-PROPELLED HORIZONTAL DRILL

FOR BLAST HOLE DRILLING

● Heavy all welded steel carriage and four individually adjustable leveling jacks make setups faster, drilling smoother. Fingertip hydraulic control permits instantaneous change of drilling feed. Bores 5 to 10-inch diameter blast holes to horizontal depths of 120 ft. or more.

Heavy-Rugged

- ✓ McCARTHY DRILLS PAY THEIR WAY
- ✓ MAKE MORE MONEY FOR YOU
- ✓ RECORDS SHOW 40% MORE HOLES
- ✓ LIST OF USERS ON REQUEST

● McCarthy Vertical Drills adapt to any job where ordinary rock formations are to be blasted.

Designed with compact retractable hydraulic tower for Truck, "Cat," Half-track or Jumbo mountings. Power shafts made of tough alloy steel. Simplified construction throughout.

Over-all height with tower reclining: 7 ft., 4 in. Wt.: 5,100 lbs. All McCarthy units can be operated with Gasoline, Diesel or Electric power units. Write for descriptive literature.

Powerful

VERTICAL DRILL

FIFTY YEARS DRILLING EXPERIENCE 1901-1951

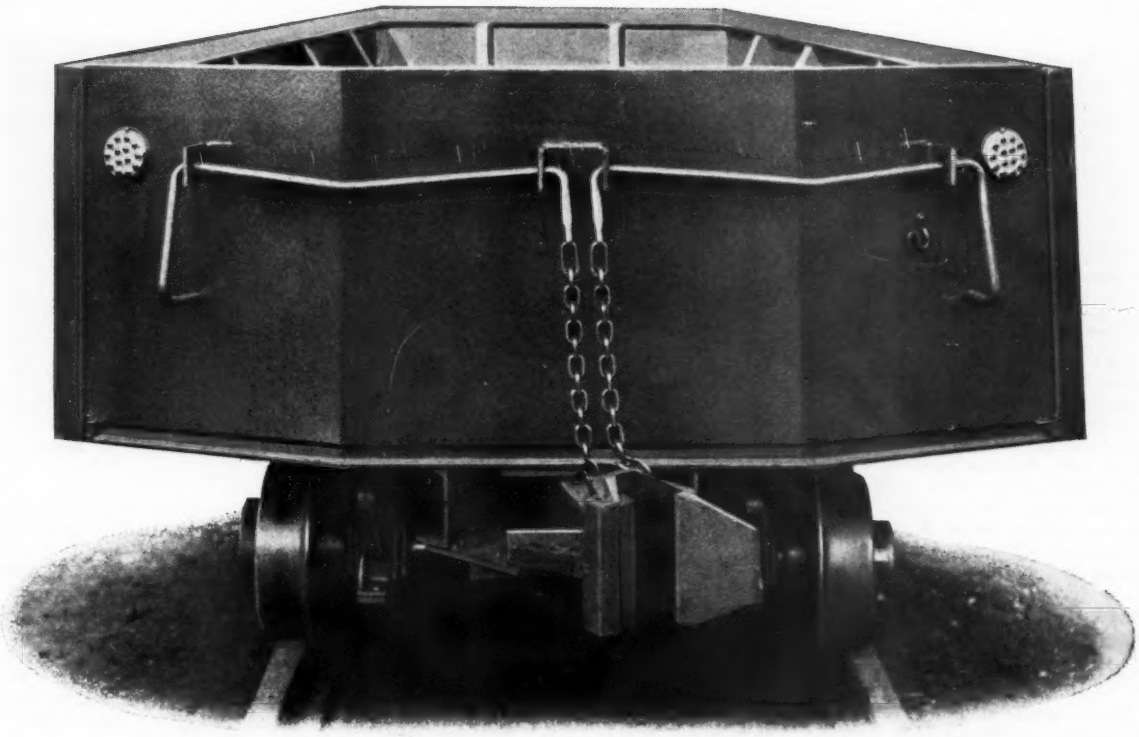
MANUFACTURED BY

SALEM

THE SALEM TOOL COMPANY

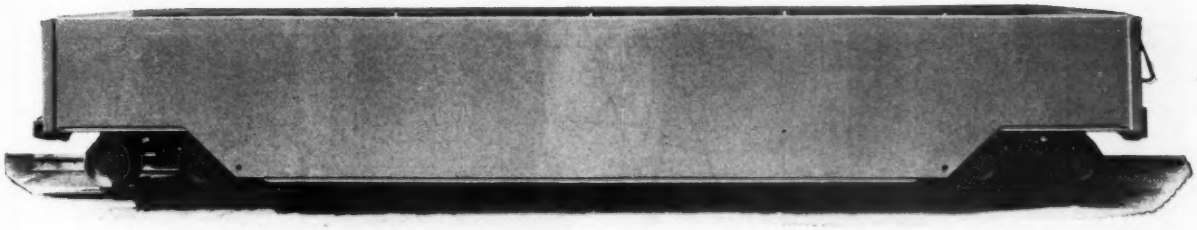
779 SOUTH ELLSWORTH AVE. — SALEM, OHIO, U. S. A.

SALEM



Like Your Mine Cars BIG?

Bethlehem 17-ton car with cast-steel, high-speed trucks, automatic couplers, roller bearings, forged-steel wheels, and Mayari R corrosion-resisting body.



In today's high-production mines, the big car continues to prove its economy and overall value. This is shown pretty clearly by the increase in mine car sizes during the past few years. Till recently, a 10-ton car was a "big one." Now it looks practically dwarfed when compared with the Bethlehem car shown here.

Study the photos for a moment. They're pictures of a giant. This streamlined beauty, though lean and low to the ground, holds 17 tons. It's built for *loads* . . . and it's built to carry them year after year in the toughest kind of service.

Bethlehem of course makes cars in all sizes, large and small. Many mines still hold a preference for smaller units, and we design and build plenty for this type of customer. Whatever your needs may be, always feel free to talk them over with us. Our engineers will do their best to work out mine car problems with you, any time you choose to call them.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

Aluminum Ores

(*Continued from page* 34)

mold is made of iron and is 10 ft 10 in. by 3 ft 9¼ in. by 5 ft. The lower part of the anode is gradually baked by the heat in the cell and as it is oxidized by the alumina, continuously replaced at the top.

This anode has iron pins embedded in the top. As the anode is consumed these pins are gradually lowered into the cell but are withdrawn as they approach the molten metal. A contact would short circuit the cell. In some cases the pins are adjustable in their connection with the busbars carrying the electric current. When they are within 6 in. of the aluminum metal in the cell they are twisted out of the hole which is then filled with a carbon mixture and a new pin inserted. This is done with no pause in the operation of the cell. The consumption of carbon in the smelting operation is about ¾ lb for every pound of aluminum produced and the manufacture of both types of anodes is an industry in itself.

Chemistry Simple

Basic reactions in the Hall process of smelting aluminum are:

$Al_2O_3 + 3C \rightarrow 2Al + 3CO$, when the oxidation of the alumina is incomplete, and

$2Al_2O_3 + 3C \rightarrow 4Al + 3CO_2$, when reaction is complete.

In practice about four tons of bauxite reduce to two tons of alumina from which about one ton of metallic aluminum is extracted. In addition, 1300 to 1500 lb carbon are consumed in anodes and cathodes as 20,000 kwh pass through the cell. About 0.7 lb carbon and 10 kwh to one lb aluminum are required. An 8000-amp cell will produce about 40 lb of metallic aluminum per hour. Dimensions cited above are for a 35,000-amp cell.

Make Synthetic Cryolite

The cryolite bath 6 to 12 in. deep is maintained at a temperature of 1900° F. Synthetic cryolite is made from fluorspar by treating it with sulphuric acid to produce calcium sulphate and hydrofluoric acid. The reaction is:

$CaF_2 + H_2SO_4 \rightarrow 2HF + CaSO_4$.

The hydrofluoric acid is then used to treat sodium oxide and alumina, as follows:

$$3Na_2O + Al_2O_3 + 12HF \rightarrow 2Na_3AlF_6 + 6H_2O.$$

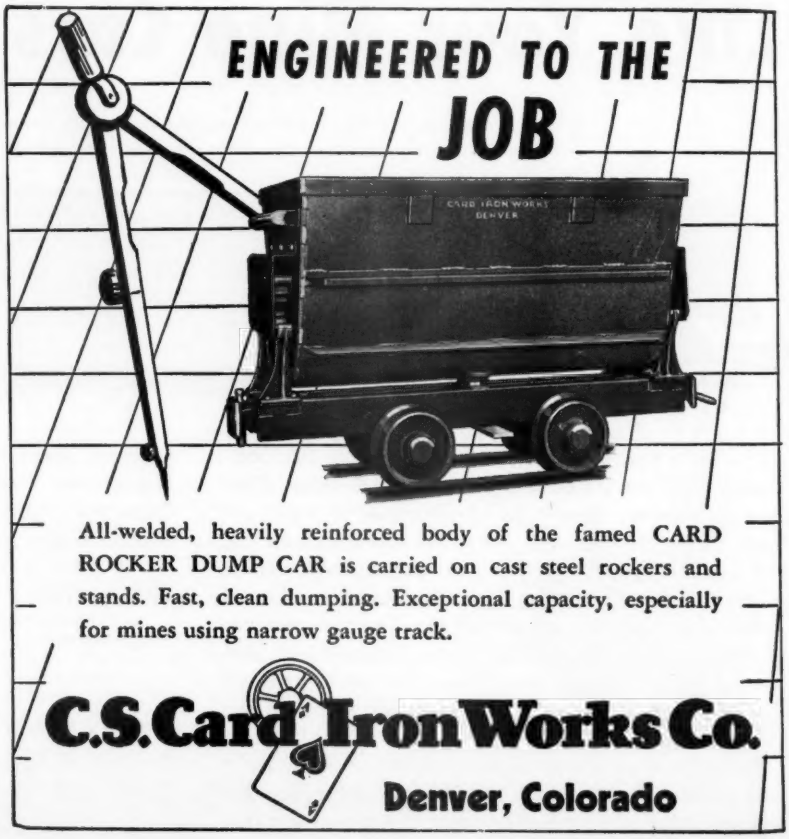
The molten cryolite will hold up to 20 percent alumina in solution, but in practice the bath usually carries from two to five percent alumina.

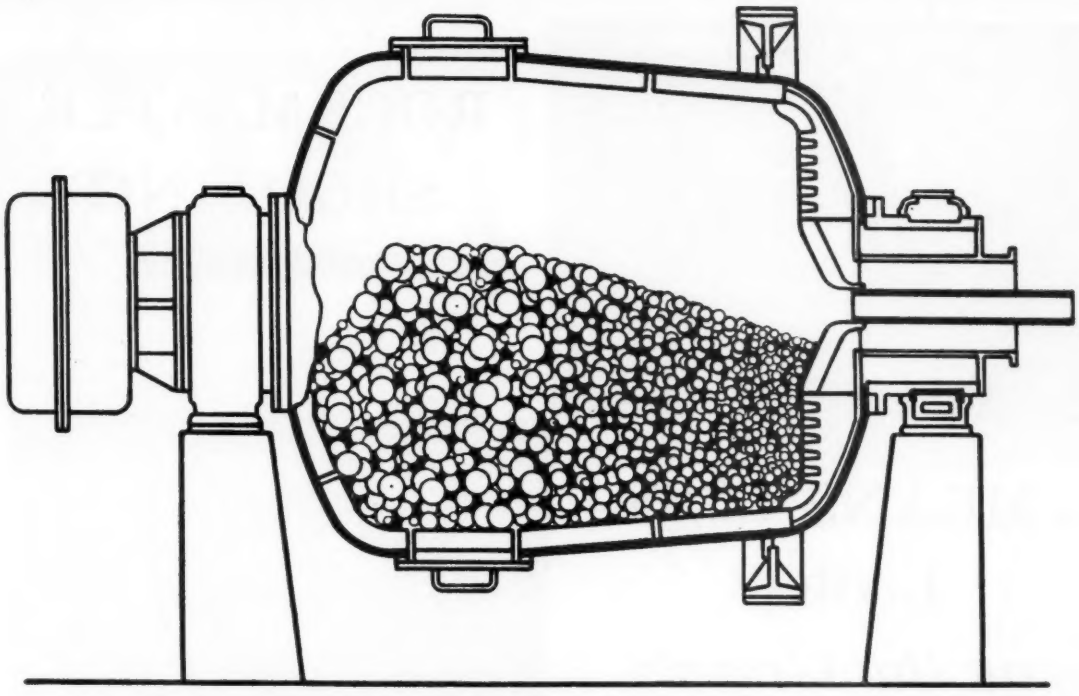
In the operation of an aluminum reduction plant up to 100 cells may be arranged in series. Through these pass 35,000 amperes at 600 v. Thus in a 100-cell series the voltage drop across each cell is 6 v.

Crust on the cell is broken with an iron rake and fresh alumina is stirred into the molten electrolyte

When the cryolite is melted by the passage of the electric current, alumina is poured into the cell and mixed with it. When the metal reaches a depth of 6 in. at the bottom of the cell, it is drawn off and cast into pigs. Alumina is added, as needed, to keep the charge at normal depth. In the carbon anode cell, anodes are replaced as they are consumed, with no loss of production.

A crust forms on top of the charge which must be broken at intervals and removed. Alumina is added from overhead hoppers and stirred into the charge. When the percentage of alumina becomes too low, gas on the anodes cause the voltage drop across the cell to rise. An iron rake passed through the metal will restart the action by splashing metal against the anode, thus reducing the voltage across the cell and returning it to normal condition. The reduction process is continuous.


ENGINEERED TO THE
JOB
All-welded, heavily reinforced body of the famed CARD ROCKER DUMP CAR is carried on cast steel rockers and stands. Fast, clean dumping. Exceptional capacity, especially for mines using narrow gauge track.
C.S. Card Iron Works Co.
Denver, Colorado



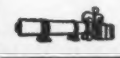
WHY *Tricone Mills?*

Here are some of the reasons why the Hardinge Tricone Mill is more efficient than other mills:

1. The tapered barrel causes correct ball alignment. Grinding energy is conserved thereby. Ball consumption is reduced, the big fellows are kept away from the little ones.
2. The Tricone Mill occupies less floor space for a given grinding volume than any other type of mill ever built.
3. New design bearings, reduce friction and cut overall power consumption about 5%.
4. When crowded for more capacity, a grate is added, at a proportionate increase in power, but with this type of grate mill, the large balls are kept at the feed end, and only smaller balls are in contact with the grate, which minimizes wear.
5. Tapered ends reduce end friction, as is evidenced by lower liner consumption and power.
6. Ideal for large tonnages.

11′ diameter Hardinge Tricone Mill in a copper mining operation. This mill replaced two smaller mills with a net gain of 22.6% grinding efficiency.

Write for Bulletin AH-414-52

HARDINGE
COMPANY INCORPORATED
YORK, PENNSYLVANIA — 240 Arch St. • Main Offices and Works
NEW YORK 17—122 E. 42nd St. • 205 W. Wacker Drive—CHICAGO 6
SAN FRANCISCO 11—24 California St. • 200 Bay St.—TORONTO 1


CONICAL MILLS
COUNTER CURRENT CLASSIFIERS
THICKENERS CLARIFIERS
RUGGLES-COLES DRYERS
CONSTANT WEIGHT FEEDERS

ROCKMASTER SHOOTING

Here

MEANS LESS LABOR *on the Grizzly*

EVEN if labor and other costs weren't rising, there still would be no sense in paying for more work on the grizzly than is absolutely necessary.

That's why alert mine managers are giving increased attention to getting improved breakage in primary blasting—so that most secondary blasting can be eliminated. Pop shots and other work on the grizzly are being greatly reduced by modern methods of getting better fragmentation at the face—through the ROCKMASTER Blasting System.

One manager reports that he formerly had two men working full time on the grizzly, but now, thanks to ROCKMASTER methods of loading and firing, he needs only one man working part time. Another says he has been able to eliminate all work on the grizzly except on rare occasions.

But fragmentation isn't the only benefit of ROCKMASTER blasting. Modern ROCKMASTER methods can bring you true control over throw, savings on drilling and dynamite and a drastic reduction of noise and vibration. All this adds up to substantial savings in time, material and manpower . . . which means more production per day at less cost.

We'll be looking for you at the Metal Mining Convention in Los Angeles, October 22, 23, and 24. Atlas headquarters will be in the Biltmore, too.

ROCKMASTER: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES

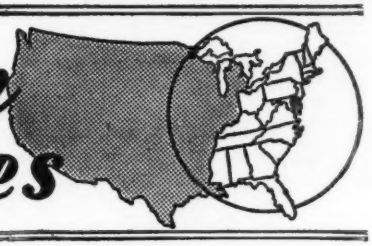
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

NEWS and VIEWS

Eastern States



3½ Mile Coal Conveyor

A 3½-mile, 30-in. rubber belt conveyor is now in operation for the Ebensburg Coal Co. in Clover, Pa. A key feature in the broad mechanization program of the company, according to T. L. Aitken, vice-president in charge of operations, the belt carries 250 tons of coal an hour at a rate of 400 fpm from the working face to the tipple.

R. E. Taggart Memorial

In order to encourage young men of the southern anthracite region who may not otherwise have the opportunity to study mining engineering, The Philadelphia and Reading Coal and Iron Co. has established a four-year scholarship in mining engineering, to be awarded annually. This announcement was made recently by Edward G. Fox, president of the company.

It will be known as the Ralph E. Taggart Memorial Scholarship in memory of the late president of the P and R Co.

Robert Zmudzin, 17, of Shamokin, Pa., a 1951 graduate of Coal Township High School, is the first winner of this full scholarship.

The winner may elect to attend the mining schools at one of three institutions, Lehigh University, Lafayette College, or Pennsylvania State College. The scholarship will continue for the full four years provided the student maintains grades satisfactory to his college.

The award is open to students in the upper half of the graduating classes of all high schools located within the area of P and R Co.'s three operating divisions. Final selection of the scholarship winner each year will be made by the proper officials of the college or colleges concerned.

ACS Hear Coal Research Men

Members of the American Chemical Society present at a meeting, held in New York, September 7, were told that the commercially successful conversion of coal into gaseous and liquid fuels requires a better understanding of the chemistry involved in such processing.

This was the signficance of papers presented on the gasification of coal and coke by Dr. G. E. Goring and George P. Curran, who, as members of the research and development staff of Pittsburgh Consolidation Coal Co. reported some of that organization's research findings on this subject.

A third paper presented at the meeting by Dr. M. B. Neuworth, also

More than 3000 persons were present when the winning team in the ninth annual Championship First Aid Contest sponsored by the Pennsylvania State Bituminous Safety Association was awarded the Mine Safety trophy. The team, from Republic Steel Corp.'s Indianola Mine, scored 99.85 to win over 34 other teams from central and western Pennsylvania. Eastern Gas and Fuel Associate's Melcroft Mine team placed second with a score of 99.6; third place went to the Westland Mine team of Pittsburgh Coal Co. which scored 99.55. The winners, shown above with George H. Deike, president of Mine Safety Appliances Co., who is making the presentation, are left to right, Vince Stanek (Captain), Robert Miller, Arthur Starnes, George Walker, Paul Yeloushan, Uriah Proser and George Cingle. The meet was held at the Cambria County Fair Grounds Arena, Ebensburg, Pa.

Annual Conference of the Coal Division

William Penn Hotel, Pittsburgh, Pa., Thursday, November 15, 1951

ALL coal operators and manufacturers interested in the improvement of coal mining are cordially invited to attend the 1951 Coal Division Conference at the William Penn Hotel in Pittsburgh, Thursday, November 15. The Conference will be for one day only, a morning session starting at 10 A. M., followed by a business luncheon at noon, and concluding with an afternoon session, adjourning about 5 P. M.

The Committees will present preliminary reports for open discussion. Copies of the reports will be available so that all present may take part in the discussions and offer suggestions for future studies.

Seven committees will report, covering studies now under way as shown in the following schedule:

Committee on Mechanical Loading—Uniform Machine Controls for Mobile Equipment—Projections for Continuous Mining.

Committee on Roof Action—Roof Support for Continuous Mining—Roof Bolt Testing—Specifications for Roof Bolting Materials.

Committee on Surface Preparation—Sludge Recovery from Bituminous Washers—Stream Clarification and Dust Control.

Committee on Haulageroads—Modern Track Construction for High Speed Haulage—Heavy Rail Turnouts—Block Signals.

Committee on Power—A. C. Voltage for Face Equipment—Standard Dimensions for Cables and Hose Conduits—D. C. Substation Location and Equipment.

Committee on Conveyors—Service Haulage for Continuous Mining—Methods of Belt Loading.

Committee on Ventilation—Recommendations for a Ventilation System for a Belt Conveyor Mine.

of Pitt-Consol's research group, dealt with this organization's research experience in the carbonization of coal. By processes now being developed, the company is finding methods for the production of important chemical intermediates used in the manufacture of plastics.

Coal Company Aids Students

In the past eight years the Princess Elkhorn Coal Co. of David, Ky. has helped 26 young men and women to obtain college educations.

According to David L. Francis, president, Princess Elkhorn scholarships are worth $450 a year for each of two girls who enter Pikeville Kentucky College for a two-year course; $400 a year to each of two boys who enter the University of Kentucky each year for four-year courses; and $400 a year to one boy or girl who enters any American college or university of his or her choice for a four-year course.

Mineral Claims Denied

A suit instituted by James C. Lenney, Potsdam, N. Y., and the estate of Anthony J. Gingras, Gouverneur, N. Y., against Jones & Laughlin Ore Co. has been decided in favor of the defendant by New York state's court of last resort, the Court of Appeals. Lenney and Gingras sought to compel the defendant company to pay them millions of dollars for allegedly transgressing their presumed Benson Mines claim.

Limestone Properties Bought

Armco Steel Corp. has purchased all the oustanding stock of two companies which own and operate limestone quarries at Piqua, Ohio, Charles

R. Hook, chairman of the board of Armco announced recently.

The two companies are The Ohio Marble Co., the operating concern, and Piqua Stone Products Inc., a selling organization. About 100 men and women are employed.

Both purchased from Mrs. Miriam W. Hall, Piqua, the companies have been the principal source of limestone for many years for the two blast furnaces Armco operates at its Hamilton, Ohio, plant. It is estimated that approximately 25 million tons of limestone are available on the property which consists of about 650 acres including quarries, land, and buildings.

Hook explained that Armco's combined needs for limestone at Hamilton and Middletown will be approximately 400,000 tons per year when the new $35,000,000 blast furnace and coke oven plant in Middletown is completed late next year.

The quarries at Piqua will produce that amount of blast furnace limestone each year, in addition to about 200,000 tons of related products such as road stone, agricultural limestone, whiting for the rubber industry, and putty filler. The related products will continue to be sold to other industries as in the past. Except for a brief period during the 1913 flood, the quarries have been operated continuously since the early 1890's.

Sizes and accessories for your individual requirements. Write for information and sample.

BEMIS BRO. BAG CO.

111 No. 4th Street, Box 35, St. Louis, Mo.

stay on the job

CP PORTABLE COMPRESSORS

Built for dependability, CP PORTABLE AIR COMPRESSORS have a well-earned reputation for staying on the job and cutting operating costs.

Providing "600 cubic feet of air on wheels," the Diesel-driven CP-600, powered by a six-cylinder Caterpillar engine and with a V-8 compressor, is notable for smooth, economical performance.

It is fuel-thrifty because the gradual speed regulator adapts engine speed to air demands, also minimizing engine wear and reducing maintenance.

Other features of this two-stage, air-cooled compressor include pressure lubrication, large Simplate valves and self-adjusting clutch.

CP Portable Compressors are available in gasoline-driven models from 60 to 315 cfm actual capacity, and in Diesel-driven models from 105 to 600 cfm capacity.

Write for detailed information.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Champion, a braided hose made with oil-resisting Reprene tube, is available in all standard sizes in 50 ft. lengths Ask for it today!

ACTUAL MINE TESTS PROVE } **REPUBLIC AIR HOSE**

GIVES TOP PERFORMANCE UNDERGROUND !!

One of the world's largest iron mines recently voted Republic Champion the best available air hose for use with underground power loaders. Selection was made after a series of tests proved it out-performed all competing hose!

Republic's Champion received top honors for its tough, highly visible yellow safety cover . . . its ability to stand up for longer service periods under extreme pulsating and high working pressures . . . and its light-weight, easy-handling, flexible construction.

Take advantage of these exceptional Republic features. Order Champion Air Hose today from your local Republic Distributor.

INDUSTRIAL RUBBER PRODUCTS BY

REPUBLIC RUBBER DIVISION

Lee Rubber & Tire Corporation

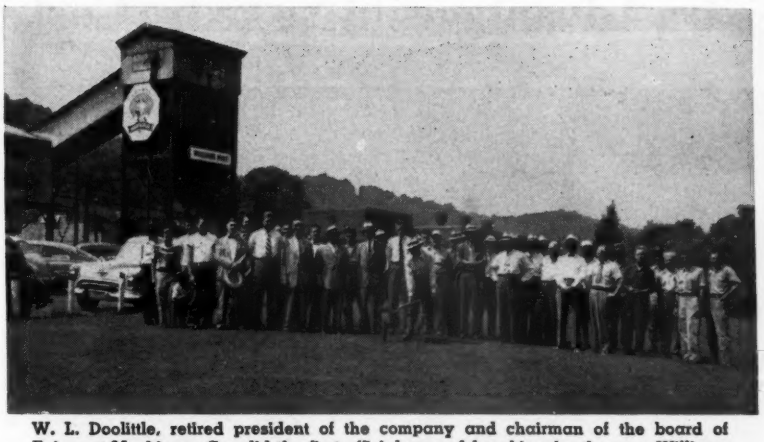
YOUNGSTOWN, OHIO

To Get More Aluminum

Shortly the U. S. stockpile of critical material will receive additional supplies of ECA-procured aluminum and Madagascar graphite and phlogopite mica.

In addition, ECA announced that it has advanced the equivalent of about $8,000,000 in pounds sterling to the British firm of Chibuluma Mines, Ltd., to develop high-grade copper-cobalt in northern Rhodesia. The firm will repay the agency in ore shipments to the U. S. stockpile.

The aluminum results from ECA purchases of Greek bauxite, which is being processed into aluminum in Germany and forwarded to the U. S. Madagascar graphite and phlogopite mica are being purchased under an agreement with France.



W. L. Doolittle, retired president of the company and chairman of the board of Fairmont Machinery Co., did the first official ground breaking for the new Williams Preparation Plant on July 19, 1951. Officials of the company, of the United Mine Workers and representatives of the press attended the ceremony.

Local vs. Local

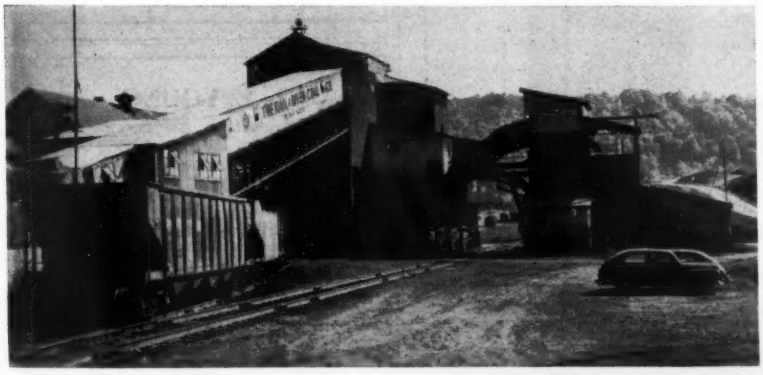
A most unusual situation was created recently when one local union of the United Mine Workers of America filed a complaint of unfair labor practices with the National Labor Relations Board against another local union, also of the UMWA. Both of the locals are at mines of Consolidation Coal Co. (Ky.), a division of Pittsburgh Consolidation Coal Co.

The case developed when the local union members of Mine 214 refused to permit local union members of Mine 207 to transfer from that mine into Mine 214, even though Mine 207 was working out and such transfers of entire crews between the interconnected mines had been the rule for years.

Two of the members of Mine 207 local union, on behalf of themselves and 54 others, filed charges of discrimination and coercion by the local union members of Mine 214 for using force and intimidation to prevent them transferring to employment at Mine 214. They demanded that the Mine 214 local union pay the 207 members for lost wages of practically a year.

Coal Company Changes Hands

Henry G. Schmidt, president of North American Coal Corp., Cleveland, Ohio, has announced that his company has accepted an option to purchase the Rail and River Coal Co., Bellaire Ohio. Rail and River is a wholly owned subsidiary of the Canadian National Railways. Transfer of property will take place November 30, 1951.



The Rail and River Coal Co. operates Mine No. 3 at Dilles Bottom, Ohio, about 20 miles down river from Wheeling, W. Va. Proven reserves at this property are said to exceed 100 million tons of recoverable coal in the Pittsburgh No. 8 seam. A total of 30,000 acres of coal land, and over 100 acres of surface property, will change hands in the transaction.

Acquisition of the No. 3 Mine by the Corporation will increase its productive capacity from 5,500,000 tons to 6,000,000 tons per year, placing it among the ten largest commercial coal producers in the United States.

Mine Drainage Studied

The Bituminous Coal Industry—through its Advisory Committee to the Ohio River Valley Water Sanitation Commission—took initial steps to meet its responsibilities for alleviating stream pollution arising from coal-operating wastes at a meeting held in Cincinnati, Ohio on August 29.

Several committees were appointed by chairman E. R. Price, of Wheelwright, Ky., to study problems peculiar to the industry. The two principal fact-finding committees are concerned with suspended solids and acid mine drainage. Chairman of these committees are L. I. Cothern of Tazewell, Va. and Larry Cook of Cleveland, Ohio, respectively.

The Advisory Committee is made up of two representatives from each of these states: Virginia, Pennsylvania, West Virginia, Kentucky, Ohio and Indiana.

Prepare New Strip Mine

T. G. Gerow, president of West Virginia Coal & Coke Corp. has announced that Paradise Collieries, Inc., a newly formed subsidiary of West Virginia Coal & Coke, had concluded arrangements under which it secured the lease rights and purchased the fee holdings of The Pittsburg & Midway Coal Mining Co. in the Paradise coal field located in Muhlenberg County in western Kentucky. Gerow, who will also serve as president of Paradise Collieries, Inc., stated that the company will immediately begin construction of a new strip mine with cleaning plant at the Paradise field, with an estimated capacity of approximately 1,000,000 tons per year.

West Virginia Coal & Coke Corp., which holds 51 percent of the stock of Paradise Collieries, Inc., will provide administrative and executive manage-

Extra Advantages at No Extra Cost

MINE locomotives and shuttle cars withstand hard usage because they are of high-strength steel construction. Why not give them storage batteries of the same construction?

In EDISON Nickel-Iron-Alkaline Storage Batteries, steel cell construction brings you high strength to withstand abuse and prevent down-time.

EDISON batteries give you the further advantage of not requiring critical adjustment of the charging rate. In fact, they can be charged through suitable resistors direct from the d-c power supply. They consistently withstand the irregular charging conditions in combination locomotives.

Then, too, they are electrically foolproof. They are not injured by accidental short-circuiting or even reverse-charging . . . by standing idle during shutdowns . . . or by freezing.

Yet you get all these advantages at no extra cost. On the contrary, EDISON Nickel-Iron-Alkaline Storage Batteries are so long lived that they effect substantial savings in annual depreciation charges. They are so trouble-free that they cut maintenance costs too. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Thomas A. Edison of Canada, Limited, Montreal.

Cutaway view of a typical cell used in batteries for mine haulage. High-strength steel construction is used in all cells.

YOU CAN ALWAYS RELY ON

EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES

AEC Seeks Man

U. S. Atomic Energy Commission desires a graduate engineer, 28-35 years old, for work covering some ore sampling, or production, and pilot and full-scale hydrometallurgical plants. Location will be in the south. Four or five years practical experience in ore-dressing and beneficiation or in chemical engineering are required and familiarity with mining and sampling methods is helpful. Salary will range from $5400 to $6400 per annum. For further information please write to George M. Gableman, U. S. Atomic Energy Commission, 1901 Constitution Ave., N. W., Washington 25, D. C.

ment for the new operation. Shaw & Co. of New York City holds the remaining 49 percent of the new company. The Pittsburg & Midway Coal Co. of Chicago will act as exclusive sales agent for coal produced from the new mine. Barring unusual delay because of material shortages, the mine should be in production by January 1953.

To Expand Williams Mine

George R. Higinbotham, president of Consolidation Coal Co. (W. Va.) division of Pittsburgh Consolidation Coal Co., recently announced that in furtherance of the company's modernization program, a modern preparation plant with washing facilities

DAVIS READ

Consulting Engineer

Layout Operation

Modern Production Methods

Plant Design Preparation

Chicago, Ill. 120 S. LaSalle St.

Madisonville, Ky. 235 East Noel Ave.

L. E. YOUNG

Consulting Engineer

Mine Mechanization

Mine Management

Oliver Building Pittsburgh, Pa.

J. W. WOOMER & ASSOCIATES

Consulting Mining Engineers

Modern Mining Systems and Designs

Foreign and Domestic Mining Reports

UNION TRUST BLDG.
Pittsburgh, Penna.

NATIONAL BANK BLDG.
Wheeling, W. Va.

for all sizes will be constructed at Williams Mine, located in the Bingamon-American field of northern West Virginia near Fairmont. Ground was broken for the plant on July 19, 1951. This new plant will produce approximately 8500 tons of washed coal per day, double the present output, with provisions for a wide choice of sizes to meet market requirements. This new facility now under construction by the Fairmont Machinery Co., the completion of which is scheduled for late 1952, will be served jointly by the Baltimore & Ohio and the Western Maryland Railroads.

Raw coal will be separated into two sizes, namely 5 by ⅜ in. and ⅜ in. by 0. The 5 by ⅜ in. sizes will be cleaned in a Chance Cone while the smaller sizes will be washed on 16 tables.

A virgin tract of coal of 80,000,000 tons in the Pittsburgh Seam will assure ample reserves for the next 40 years. As the development of the underground workings expands, additional producing units from the old portion of the mine will be transferred to the new area. When the new plant is completed, more coal-producing sections will be opened to supply the tonnage needed to utilize the new facilities fully.

MineVent TUBING

EASY TO COUPLE EASIER TO HANDLE

Only Mine-Vent Tubing gives you these easy-to-install, patented snap-on couplings. Assure you of maximum airflow always. . . . Just unsnap and rotate the tubing to eliminate an air-restricting twist—or relieve a point of wear. Easy to join unequal lengths without sewing. Take it down and reinstall it as often as you want.

Made of airtight, water and mildew-proof coated fabric. Will not tear or crack from flexing. Ask for literature.

AMERICAN BRATTICE CLOTH CORP.

210 So. Buffalo St. Warsaw, Indiana

VICTAULIC... The Best Method for Piping!

A METHOD with plenty of meaning, that's Victaulic . . . it's the world's best. The Victaulic name stands for pioneering and leadership in quick, dependable piping . . . the Victaulic Method stands for quicker, money-saving piping construction.

Here's what the VICTAULIC METHOD *is* and why it's the EASIEST WAY TO MAKE ENDS MEET . . .

- A complete line of simplified, versatile pipe couplings ¾" through 60" sizes for steel, spiral and cast iron pipe . . . that automatically provide flexibility for irregular laying contours and yet assure positive-lock, leak-proof joints even under extreme pressure, vacuum or strain conditions.
- A complete line of modern Full-Flow Elbows, Tees and other Fittings that provide for directional changes, branch lines and all of the other essentials of a piping system.
- Handy, portable Vic-Groover Tools that prepare the pipe twice as fast and with half the effort of conventional pipe threader.

On your next piping job — new construction, repairs, or alterations — try the Victaulic Method and you'll be sure to save time, work, and money.

Make that next piping job ALL VICTAULIC! Write today for Victaulic Catalog and Engineering Manual No. 44-8E.

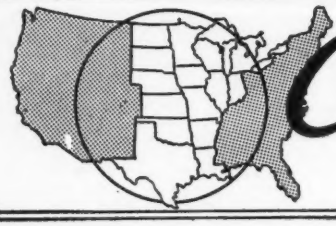
NOTE VIC'S NEW COMBINED MAIN OFFICE AND PLANT ADDRESS BELOW—

VICTAULIC COMPANY OF AMERICA
1100 Morris Avenue, Union, N. J.
Mailing Address: Box 509, Elizabeth, N. J.
Phone: Elizabeth 4-2141
Victaulic Inc., 727 W. 7th St., Los Angeles 14, Calif.
Victaulic Company of Canada, Ltd., 406 Hopewell Ave., Toronto10
For Export outside U.S. & Canada: PIPECO Couplings & Fittings, Pipe Couplings, Inc., 30 Rockefeller Plaza, New York 20, N.Y.

27TH VICTAULIC YEAR

The easiest way to make ends meet
VICTAULIC
PIPE COUPLINGS AND FITTINGS

Copyright 1951, by Victaulic Co. of America



Central States

Good Enough Mine Sold

Good Enough Mine, located about one mile east of Aurora, Mo., formerly owned by George Moore, has been sold to Mattes Brothers and associates. The 110-acre lease has been thoroughly drilled, and commercial ore bodies have been developed on both the 80-ft and 250-ft levels. There are several shafts in ore, but only two are being put into operation at this time. One six-ft shaft is producing from the 80-ft level; and the mill shaft, is being dewatered. The ore, largely zinc blende, is in the Reeds Springs formation, which extends one mile north and south at this point.

Cleaning Kansas Coal

On September 4, the new cleaning plant of The Pittsburg and Midway Coal Mining Co. was put into operation. Located four miles northwest of Hallowell, Kan., the plant is washing coal mined from the company's Mine No. 19, a stripping operation. Built by McNally Pittsburg and designed by them in conjunction with the engineering staff of Pittsburg and Midway, the plant will handle 500 tph.

Stripping at Mine No. 19 is on a three-shift basis while coal is loaded and cleaned during one shift. Raw coal is transported from the pit to the cleaning plant by truck and, when washed, is shipped to market via the Missouri, Kansas and Texas Railroad.

Midwest Mineral Exploration

The search for new reserves of strategic and critical minerals under the Interior Department's Defense Minerals Administration's financial assistance program is gaining momentum in the Upper Midwest.

Mining operators in three states—Wisconsin, Michigan and South Dakota—to date have signed 10 Government exploration contracts involving nearly a million dollars, Paul Zinner, Bureau of Mines Region V Regional Director, reported recently.

Of the $945,035.75 now being spent for mineral exploration in these states, the Government is contributing more than one-half of the cost or $524,493.66 and private industry, $420,542.09. This total expenditure is 11.7 percent of the $8,014,846 invested in 128 mineral exploration contracts throughout the country (as of September 10, 1951) entered into between the Government and mine operators or lessees since the program began last April.

In Michigan, the Government put up $284,096 of a $568,193 total for copper exploration; in Wisconsin, $108,025.66 of $229,762.75 for lead-zinc exploration; in South Dakota, $90,000 of $100,000 for tin, tungsten, columbium and tantalum exploration; and $42,372 of $47,080 for mica and beryl exploration, also in South Dakota. In the three states, industry has contributed a total of $420,542.09 under the DMA program while the Government has put in $524,493.66.

Under the terms of the Defense Production Act of 1950, DMA is empowered to provide financial assistance for mineral exploration projects on a "matching fund" basis.

The Government contributes 90 percent of the cost in exploring for new sources of mica, beryl, tin, tungsten, columbium and tantalum, and 50 percent, for copper, lead and zinc. Private industry pays the rest. Because one lead-zinc contract went beyond normal exploration, the Government paid only 35 percent of the cost in this instance.

To Up Aluminum Supply

Plans for increasing the nation's alumina producing capacity by 180,000 tons annually, through the addition of new production facilities at an existing plant in Mobile, Ala., were announced recently by Allen B. Williams, president of Aluminum Ore Co., a subsidiary of Aluminum Co. of America.

Alumina (aluminum oxide) is the material obtained from bauxite ore as the major preliminary step in the production of aluminum and of alumina chemical products. About two lb of alumina are used in producing one lb of aluminum.

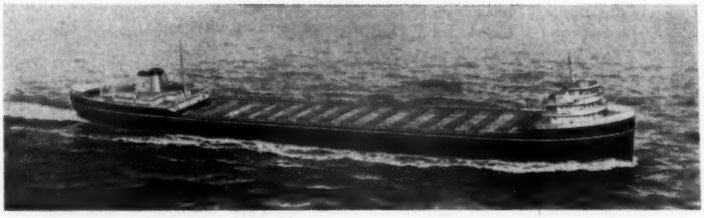
The Aluminum Ore Co. is also currently erecting a new aluminum works at Bauxite, Ark., in addition to operating plants at Mobile and at East St. Louis, Ill.

The new construction program, together with the capacity being added in Arkansas, will boost the Alcoa subsidiary's alumina production capacity by approximately 70 percent when completed. Construction at Mobile is scheduled to begin in the immediate future, and production from the plant at Mobile is expected to start by late 1952.

Geological Projects Underway

Five geological projects are currently under way in South Dakota. In the Firesteel coal area, various tests will be made to appraise the coal deposits. Oil structures are being mapped north of the Black Hills. An artesian water survey is being made in the lower James River basin. Analysis of gravel deposits and studies of shallow water supplies are being made in the Big Sioux basin, starting at Watertown and working south.

Increase Shipping Capacity



Two of three C4 type ocean-going vessels being converted on the Atlantic Coast for Great Lakes service have been christened. The *Tom M. Girdler* has already completed the journey to Chicago through the Mississippi River and Illinois Waterway, and the *Charles M. White*, christened in Baltimore, Md., on September 20, is presently en route. In the near future, the third C4 type ship undergoing conversion will be christened.

Like the *Tom M. Girdler*, the *Charles M. White* will have a capacity of 14,500 tons and is expected to make the round trip between Cleveland and Duluth in about 4½ days.

At Baltimore the entire forward half of the vessel was removed and replaced with a new forward half, 80 ft longer, constructed in Pascagoula, Miss., and floated to Baltimore. Overall length of the converted vessel is 600 ft and the beam is 71 ft 6 in.

An artist's drawing of the *Tom M. Girdler* is shown above.

AMERICAN POTASH & CHEMICAL CORP.

The home of **TRONA** Brand Alkalies

Welcomes the delegates of the

AMERICAN MINING CONGRESS

To Southern California

MILLS

Serving the open-pit mines of the West

Blast-hole tools

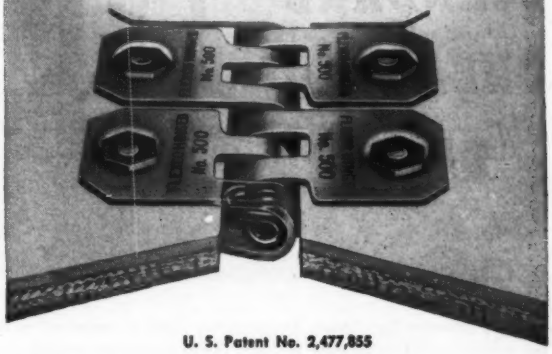
BITS
STEMS
BAILERS
SOCKETS
FISHING TOOLS

MILLS IRON WORKS, INC.

929 No. Main Street
LOS ANGELES 12, CALIF.
Mutual 4268

... the new separable

FLEXCO HINGED
BELT FASTENERS



U. S. Patent No. 2,477,855

- For joining underground extension conveyors.
- A FLEXCO fastener that is HINGED. Has removable hinge pin.
- Troughs naturally, operates smoothly through take-up pulleys.
- Strong, durable . . . pull or tension is distributed uniformly across joint.
- For conveyor belts ⅜" to ½" thick.

Order From Your Supply House. Ask for Bulletin HF 500.

FLEXIBLE STEEL LACING CO
4675 Lexington St., Chicago 44, Ill.

10 YEARS DEVELOPMENT

On Field Tests in Every Type of Prospecting and Stripping Throughout the World

★

Also available in the popular

STANDARD ONE-SPEED DRILL

The Parmanco Two-Speed Transmission Drill is designed to meet the requirements of the general prospecting field where it is not necessary to drill in solid limestone. Special sliding frame permits drilling and pulling of augers without moving drill. New design of chuck eliminates all hand operation in raising power plant. Recommended for 50 to 60 feet with four and one-quarter inch equipment. Under favorable conditions it is being used to greater depths and can be used with six inch equipment.

PARIS MANUFACTURING COMPANY

PARIS, ILLINOIS

Coal Prevents Power Stoppage

A new use for coal has been discovered because of the ingenuity of a power plant superintendent and Nature's erratic behavior.

During the recent floods in the midwest, waters of the Kaw River started to approach a giant power plant which generates the electricity for northeastern Kansas, including the capitol city of Topeka. When the threat became apparent, superintendent J. L. Owens took steps to make the plant's coal stockpile serve a double purpose. Using 60 men, trucks, bulldozer and crane, and other equipment, he built a dike of coal around the building and big substation. Fifteen-hundred tons of coal were used in the dike, 4 ft high and 14 ft wide. The dike held and power continued to flow out to Kansas communities.

Search For Iron Ore

A program of exploratory diamond drilling has been started by the Hanna Coal and Ore Corp. in Becker County, Minn. The area has been explored by airborne magnetometer, but almost no diamond drilling has been done up to this time. Drilling will be guided by data accumulated in the aeromagnetometer survey.

Creighton Project Completed

Two new projects, involving total expenditures of $17,000,000, have been completed by The International Nickel Co. of Canada, Ltd. R. Leslie Beattie, vice-president and general manager of Canadian Operations, has announced that a new shaft and a new concentrator are now in operation at the company's Creighton Mine in the Sudbury District of Canada.

The two projects are part of INCO's program of underground mine development to replace the surface mine now approaching depletion. There are now 13 shafts servicing the company's underground operations. Designed for ore-hoisting only, the new shaft has been sunk to an initial depth of 2050 ft. It is 8½ by 24 ft in cross section and concrete-lined throughout.

The new mill has a capacity of 10,000 tons per day, and the product, a bulk concentrate, is pumped through a 7½-mile long pipe line to the smelter at Copper Cliff. Sand removed from flotation tailings is returned to the mine to be used as backfill.

Stripping at Quaker

One of the Tri-State District's oldtimers, the Quaker Mine, shut down several years ago, is being reopened as a stripping operation by Dick Mills and Bud Allen, two independent operators. An eight-man crew equipped with an electric shovel is working the mine at the present time. Ore is

trucked to the Mattes Brothers custom mill, several miles east of Joplin, Mo.

Ore, which is in hard rock about six ft from the surface, is blasted on the night shift and loaded out on the day shift. The pit and two shafts are being dewatered with a pump on the old 200-ft level.

Prospect for Uranium

The Chicago and Northwestern Railway began in mid-June to use a Geiger counter to hunt for uranium along its 10,000 miles of track. Railroad forestry agents made the first search in the forested areas of the road in Minnesota and Wisconsin. The railroad operates in Minnesota, Wisconsin, North and South Dakota, Iowa, Nebraska, and Wyoming.

Serve Yourself Coal

You can not only get popcorn and cold drinks from a vending machine but also coal, as it has been added to the "put a coin in the slot" list. Two of the machines now in operation are at the Merchants Ice and Coal Co. of St. Louis and the Fulton Fuel Co., Chicago. As much as 600 bags of coal a day have been sold by one of these vending machines.

Small users of coal, who for one or more reason choose to buy on a day-to-day basis, are able to serve themselves. The machines can be loaded during slack periods in the retail yard day, making them attractive to the retailer also.

To Name Iron Ore Carriers

Three new iron ore carriers currently under construction for the Pittsburgh Steamship Co. will be named for three directors of the United States Steel Corp., it has been announced by Walter C. Hemingway, president of Pittsburgh Steamship Co.

The vessels will be named the *Philip R. Clarke, Arthur M. Anderson,* and *Cason J. Callaway.*

"The selection of these names for the Pittsburgh Steamship boats reflects our pride in these new carriers and also pays tribute to three men who have been of great service to United States Steel," Hemingway said. "Those of us who sail the Great Lakes feel that one of the highest tributes that can be accorded to an individual is to have a vessel named after him."

Scheduled for launching toward the end of the year, the three 647-ft Pittsburgh Steamship boats will add 2,200,000 tons a year to the iron ore carrying capacity of this U. S. Steel subsidiary's 61-vessel fleet. Two of the vessels are being constructed at the Lorain, Ohio, yards of American Shipbuilding Co., and the third boat is being built at Great Lakes engineering works at River Rouge, Mich.

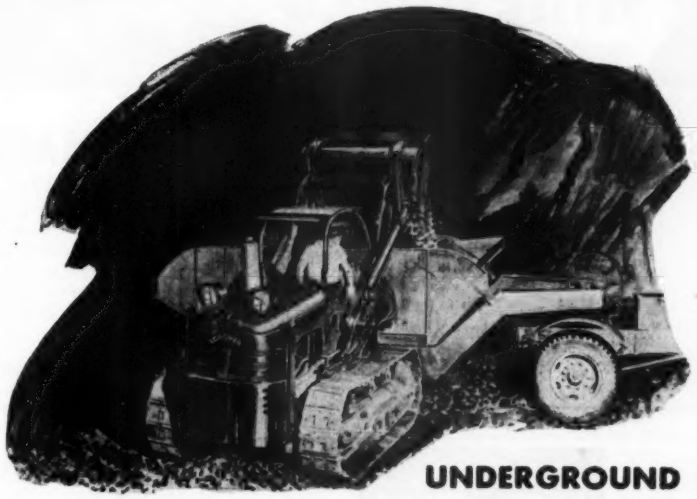
Seek Sulphur and Manganese

Development of practical methods to recover manganese in addition to sulphur and iron from Minnesota's reserves of low-grade manganese-bearing iron ore and iron sulphide deposits are among major metallurgical research problems now being tackled under an expanded defense program by U.S. Bureau of Mines metallurgists in Minneapolis, it was announced recently by Paul Zinner, Region V Regional Director.

Research to recover sulphur and iron from iron sulphide deposits began after USBM mining engineers test-drilled deposits about 12 miles southeast of Aitkin, Minn., last year, and found enough tonnage to warrant a laboratory program.

Sulphur is high on the Government's critical materials list. Once thought sufficient to supply domestic and foreign needs, sulphur reserves in Louisiana and Texas are being hard pressed to meet the increased demands for this essential element.

No less vital to the Nation's economy is the metallurgical research to recover manganese from manganese-bearing formations on Minnesota's Cuyuna Iron Range.



UNDERGROUND

Less Track Wear More Tonnage with LODOVER

Efficient for both stripping and pit operations. Maximum operating height of 14'9" *plus* "no-turn" loading gives faster operation—less surface breakage. Time saved adds up to 50% more tonnage daily with less track wear, lower maintenance costs. That's why LODOVER turns out more work at less cost on any coal or metal mining project!

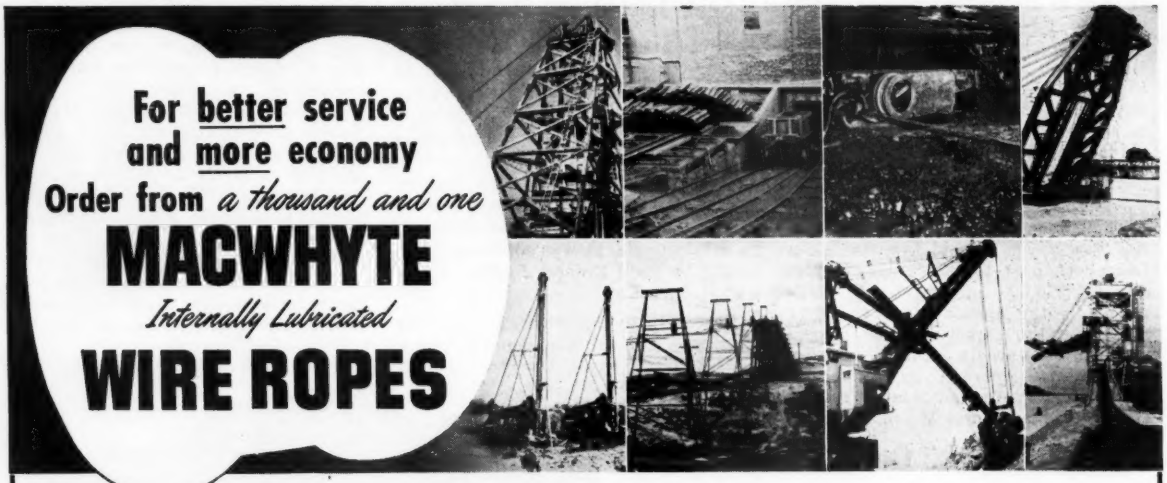
1 yard *Combination* Overhead and Front End Shovel for INTERNATIONAL TRACTORS

Write for booklet— "HOW TO Increase Tractor-Shovel Production—Decrease Tractor-Shovel Maintenance"

ELIMINATES 1200 TURNS
(in normal 8 hour shift)

MANUFACTURING DIVISION
SERVICE SUPPLY CORPORATION
2002 Erie Ave.—Philadelphia, Pa.

LODOVER Sold by Your INTERNATIONAL HARVESTER INDUSTRIAL POWER DISTRIBUTOR



For better service
and more economy
Order from *a thousand and one*

MACWHYTE

Internally Lubricated

WIRE ROPES

It will pay you to get Macwhyte Wire Rope engineered and job-proved for your equipment. Over the years, ropes for all types of mining equipment have been developed by Macwhyte. Recommendations are promptly available from Macwhyte distributors or Macwhyte Company.

MACWHYTE COMPANY

2952 Fourteenth Avenue, Kenosha, Wisconsin

Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope. Catalog available on request.

Mill depots: New York • Pittsburgh • Chicago • Minneapolis • Fort Worth • Portland • Seattle • San Francisco • Los Angeles. Distributors throughout U.S.A.

YOU GET THE CORRECT WIRE ROPE FOR YOUR EQUIPMENT WHEN YOU BUY MACWHYTE

997

why "L-B" Cast Buckets give you longer life, cleaner handling

NEXT time you replace the buckets on your elevators, check into the money-saving advantages of Link-Belt Cast Buckets. You'll find their accurate balance and advanced design pay off in proper filling, clean discharge.

For a long, durable life — they're made of top-grade malleable iron or Promal (the stronger, longer-wearing metal) to resist abrasion, corrosion and hard usage. Smooth, seamless surface minimizes friction and wear. Corners are reinforced to give added strength.

Link-Belt builds all sizes in six different styles . . . for either chain or belt mounting. Complete L-B line also includes steel buckets of various designs. Contact your nearest Link-Belt office for complete information.

LINK-BELT

CAST ELEVATOR BUCKETS

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities.

12,517

To Study Low Grade Iron Ore

Processing of low grade iron ore is to be studied at a pilot plant, now under construction, at the Groveland mine near Randville, Mich. Future operator of the mine, the Hanna Coal & Ore Corp., has awarded the contract for design and erection of the plant to the Western-Knapp Engineering Co.

With the Defense Agencies

(*Continued from page* 68)

agency said that the supply of these commodities is now believed sufficient to meet U. S. requirements during the next five years.

Price Controls—Minerals and Mining Machinery

The Office of Price Stabilization has issued a regulation making imports of mercury and metallurgical and ceramic fluospar subject to its import pricing regulation. This provides a formula whereby importers, wholesalers and retailers of imported commodities compute their ceiling prices on the basis of mark ups added to landed costs which were effective during a base period extending from July 1, 1949 to June 30, 1950.

The agency has also established new dollars and cents rate for the transportation of southern coal in colliers from Hampton Roads, Virginia to New England ports. The rates are approximately 32 cents per ton greater than those allowed under the general ceiling price regulation.

The pricing agency has amended its general manufacturers and machinery ceiling price regulations (CPR's 22 and 30) to permit manufacturers to apply for a substitute method for figuring their material cost increases. Use of the proposed substitute method may not be made by manufacturers who, prior to September 1, had filed Public Form 8, setting forth computations made in accordance with the provisions of the existing regulations.

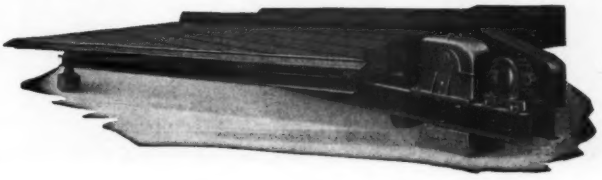
M-78 Order Modified

The National Production Authority has amended its order M-78 which covers maintenance, repair and operating supplies (MRO) and capital additions for the metal and nonmetallic mining industry, to provide that: (1) producers who were not in operation during the calendar year 1950, or the fiscal year prior to March 1, 1951, may establish a quarterly MRO quota on up to $10,000 without prior DMA approval; (2) foreign producers shall notify DMA of the establishment of MRO quotas in excess of $10,000; and (3) while producers may continue to rate rails and track accessories they may no longer rate chemicals and reagents as was permitted under the original order.

In issuing the revised order, NPA emphasized that rated orders entered prior to the time that M-78 was originally issued for materials other than controlled materials need not be revalidated. The production agency also pointed out that grinding balls are considered "B" products and the symbol DO-H-6 should be used in ordering them. It added that rings, liners and rods are considered controlled materials and the allotment symbol H-6 must be used in ordering them.

Prior to the issuance of this order the newly created Mining Machinery Industry Advisory Committee met with officials of the NPA, and told them that the inability to secure steel and copper was jeopardizing the production of mining machinery and supplies. They pointed out that CMP allotments have been insufficient in some cases and that unless the manufacturers of mining machinery can obtain materials for its production

(*Continued on page* 107)

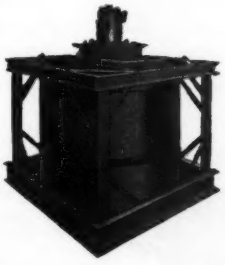


Happenstance vs. Solid Profits

Today's economics dictate recovery of every possible vestige of values. Higher wages and competitive conditions today demand more efficient handling and treatment of coals, especially those fractions formerly considered only "waste."

The SuperDuty *Diagonal Deck* Coal Washing Table stands at the forefront of equipment designed to recover fine sizes profitably. It has been a part, singly or in batteries, of every important installation in the past six years. There are sound engineering reasons why the SuperDuty has won this acceptance.

Recognition of these facts is meeting the yardstick of "solid profits" for operators, large and small. Ample evidence is available. Ask for Bulletin 119.



CONCENCO

FEED DISTRIBUTOR

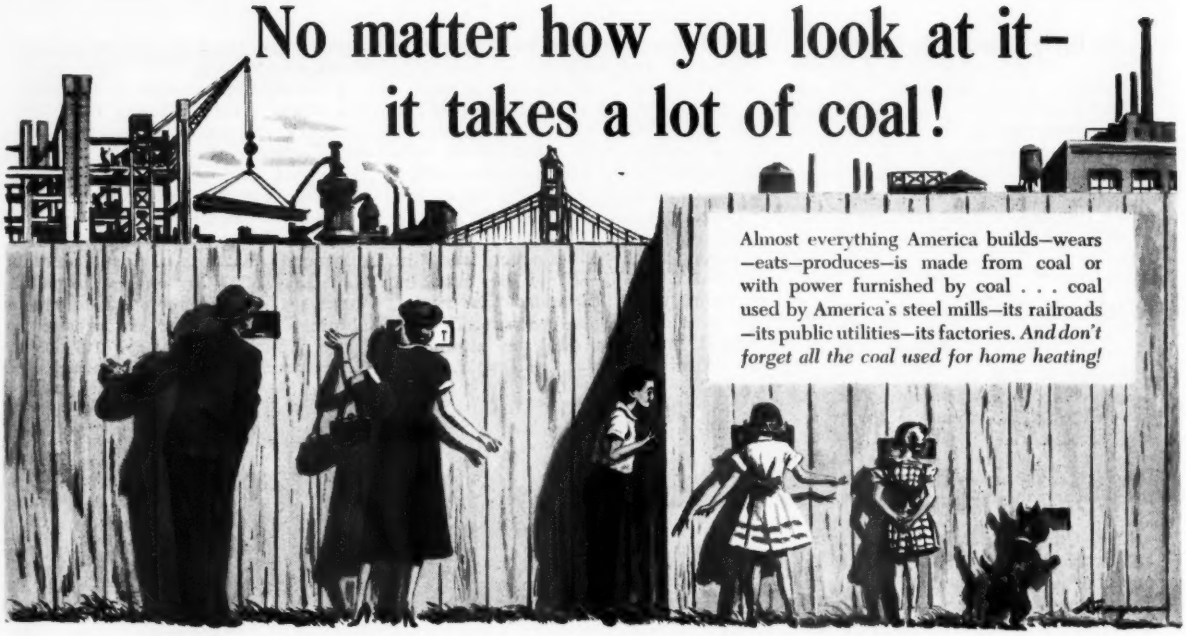
The Concenco Revolving Feed Distributor is a heavily fabricated all steel machine, with motor drive requiring ¾ H.P. or less in operation. It effectively provides a splitting of feed into any desired number of equal portions. It feeds any number of circuits or machines in battery for greater overall efficiency. Unexcelled for feeding concentrating tables.

THE DEISTER★
CONCENTRATOR
COMPANY
CONCENCO PRODUCTS

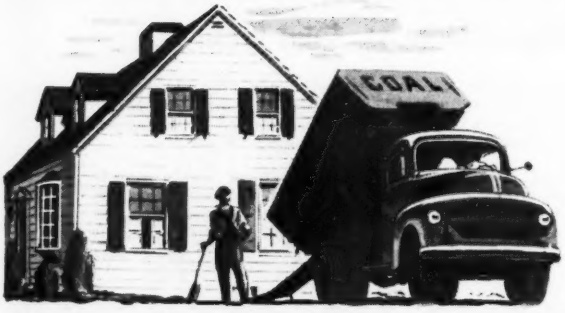
★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

917 Glasgow Ave. • Fort Wayne, Ind., U.S.A.

No matter how you look at it—it takes a lot of coal!

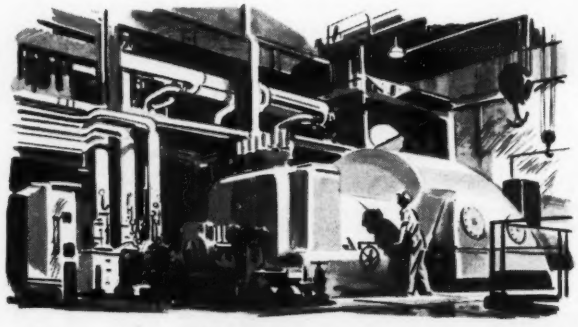


Almost everything America builds—wears—eats—produces—is made from coal or with power furnished by coal . . . coal used by America's steel mills—its railroads—its public utilities—its factories. *And don't forget all the coal used for home heating!*



More than 14 million American homes use coal for heat and rely on the steady, healthful comfort that only coal can provide. More than 120 million tons of coal are delivered by retail coal merchants every year for home heating and for schools, hospitals, churches, small industrial plants and other community uses.

Today—in addition to all the coal for everyday use—more and still more coal is needed for defense. For example, this "Walker Bulldog," latest U. S. tank, carries 76 mm. guns, goes 40 m.p.h.—*takes 50 tons of coal to make!* Will America get all the coal it needs for an economy which has to produce as never before? The answer is *yes!*



Today, coal when used with modern equipment is the most economical source of heat and power. Automatic controls and handling machinery have reduced operating costs all along the line. And, one ton of coal, used under this more efficient modern boiler, yields as much energy as that produced by three tons—a few years ago!

The most productive—the most efficient—coal mines in the world are the direct result of the free competition that accompanies private ownership. The progressive American coal companies are constantly striving for new and better ways of coal production—to cut costs and deliver a better product.

That's why the managers of this country's 8,000 mines have invested hundreds of millions of dollars in research, in modern mining machinery, in giant preparation plants and in opening new mines to replace "mined-out" or unproductive properties. *That's why this country's privately-managed coal companies have an output that no government owned or dominated coal industry—anywhere—can begin to match!*

BITUMINOUS COAL INSTITUTE
A DEPARTMENT OF NATIONAL COAL ASSOCIATION
WASHINGTON, D. C.

FOR NATIONAL DEFENSE ★ FOR PEACETIME PROGRESS

YOU CAN COUNT ON COAL!

(*Continued from page* 105)

they will be compelled to convert to direct military products.

NPA assured the committee that the defense agencies recognize the essentiality of the mining machinery manufacturing industry, and that NPA will do everything possible to assure supplemental CMP allotments for the fourth quarter in order that the production of mining machinery may not be impeded.

Coal Mine Priorities

Meanwhile the Defense Solid Fuels Administration has notified coal and coke producers of the assignment of serial numbers to their operations. These serial numbers are to be used by the producers to obtain maintenance, repair and operating supplies and minor capital additions. DSFA Administrator Connor said that more than 3,000 such serial numbers were issued, and urged coal and coke producers in requesting priorities and allocations assistance to list the serial number assigned to each of their mines or plants in any such request.

Defense officials also have under consideration the issuance of an order, similar to the M-78 order, to provide special assistance to the nation's coal mines in obtaining MRO supplies.

NPA Revamps Priority System

The National Production Authority has established a new "DX" rating for the Defense Department and Atomic Energy Commission, which gives these agencies preferential treatment in obtaining end products that are not classified as controlled materials. NPA said this new rating will also be used when needed to break bottlenecks that may be harming the defense production program.

Manpower Shortages Grow

On the manpower front, the Labor Department has reported that shortages of key defense workers are three times as bad as they were a year ago, and that there is a growing need for a large number of skilled workers.

Defense officials and industry reports have indicated that a shortage of underground and other workers exists in the metal and nonmetallic mining industry. With large expansion programs under way in mineral production, it is likely that future manpower needs of the mining industry may create an extremely tight situation. The defense agencies have urged mining companies to make known their manpower needs to the U. S. Employment Service, and if this agency fails to meet the needs to call the manpower branch of the Defense Minerals Administration for further aid.

PUT THE BITE ON ROUGH FORMATIONS WITH "BLUE DEMON" FISH TAIL BITS

Diamond drillers, mineral prospecting, grout hole drilling and foundation testing across the nation, find the "Blue Demon" Rock Bit, pictured above, their secret weapon for fast footage.

Tough, low-cost "Blue Demons" bite in where *rough* formations damage diamonds and are too hard for other bits. Specifically designed for sedimentary and overburden drilling, replaceable, non-shattering tungsten carbide faced blade fingers chip out the formation . . . giving large, clean cuttings, fast hole, more footage per bit and longer bit life.

Available in popular sizes, including "AX", "BX", "NX", 3¼", 3½", 3⅞", 4", 4¼", 4¾", 5", 5⅝", and 6"; a complete range of fractional sizes to 10" provide maximum drilling efficiency at minimum bit cost.

Sixty-eight customers in 29 states have proved this fast, low-cost footage on diamond drills with expendable "Blue Demon" Bits.

Use "Blue Demons" for

- Mineral Prospecting
- Foundation Testing
- Grout Hole Drilling

in sedimentary formations.

HAWTHORNE
"BLUE DEMON"
ROCK CUTTER BITS
REPLACEABLE BLADES
1 7/8"-10"

PATENTS PENDING

WRITE FOR ILLUSTRATED CATALOG

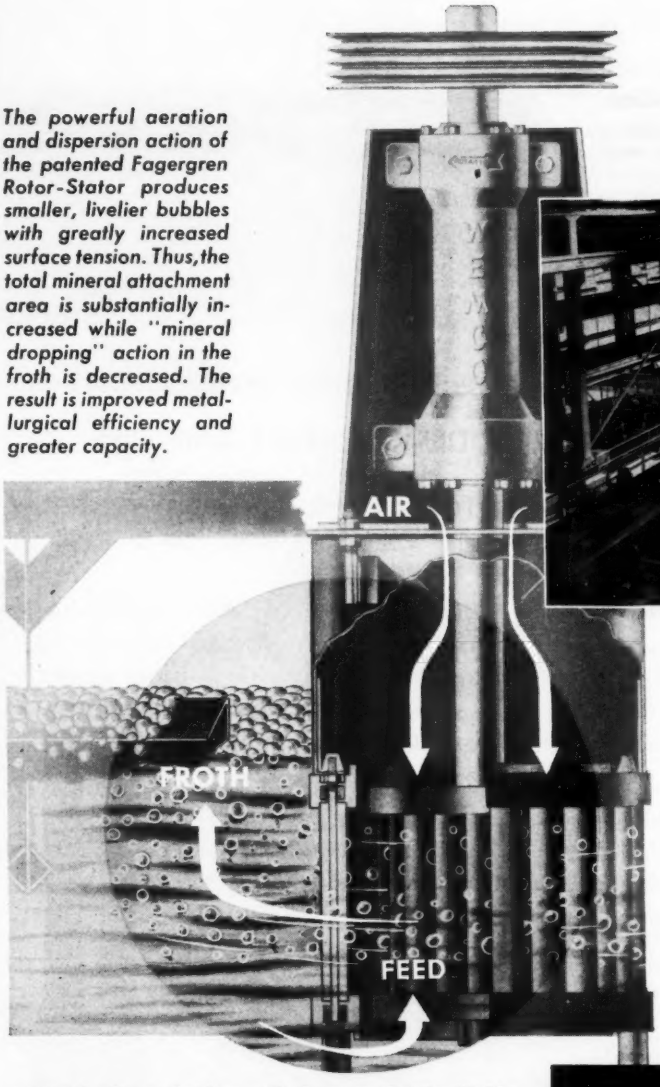
HERB J. HAWTHORNE INC.

P. O. BOX 7366, HOUSTON 8, TEXAS

WITH FAGERGRENS—

every bubble works!

The powerful aeration and dispersion action of the patented Fagergren Rotor-Stator produces smaller, livelier bubbles with greatly increased surface tension. Thus, the total mineral attachment area is substantially increased while "mineral dropping" action in the froth is decreased. The result is improved metallurgical efficiency and greater capacity.



Experienced operators know that flotation results depend on the number and type of mineral-carrying bubbles. The Fagergren Flotation Machine gets *better* results — superior mineral extraction — because it produces a greater number of *effective* bubbles than any other type machine.

The installation of Fagergren Flotation Machines in the three largest U. S. copper concentration mills testifies to its superior efficiency and wide acceptance. These and many other Fagergren installations provide practical evidence of five outstanding features:

1. Higher mineral recovery and grade of product achieved by more thorough contact between pulp and air.
2. Greater capacity per dollar of capital investment.
3. Lower reagent cost — as much as 50% saving — due to greater aeration and faster mineral removal.
4. Less power consumption per ton of feed.
5. Reduced operating costs resulting from simpler design made possible by the rotor-stator principle.

Write today for new brochure on the Fagergren Flotation Machine and for specific information to help solve your flotation problem.

WEMCO
WESTERN MACHINERY COMPANY
760-766 FOLSOM STREET · SAN FRANCISCO 7, CALIFORNIA

PRINCIPAL OFFICES

San Francisco • Sacramento • Salt Lake City • Spokane
Pocatello, Idaho • Denver • Phoenix • Chicago
Hibbing, Minnesota • Bartow, Florida • New York

EXPORT DISTRIBUTORS

- The Ore and Chemical Corporation
  80 Broad Street • New York 4, N. Y.

  Continental Europe and North Africa
  Dr. Ing. Herbert Lickfett, A/B, Stockholm 3, Sweden
  S. E. M. U., 3 Rue Godot de Mauroy, Paris, France
  Ferdinand Egeberg & Company, Oslo, Norway
  Midec, Milan, Italy
  Lurgi-Chemie, Frankfurt-Main, Germany
  G. Maltisiniotis & Co., Athens, Greece
  Agence Miniere & Maritime, S. A., Antwerp, Belgium
  Adil Gabay & Albert Koenka, Istanbul, Turkey
- Fraser & Chalmers, (S. A.) Ltd. Johannesburg, South Africa
- Lilestone & Co., Inc., Manila, Philippines

MOBIL-MILLS	FAGERGREN & STEFFENSEN FLOTATION MACHINES	DEWATERING SPIRALS
COAL SPIRALS		AGITATORS
HMS THICKENERS	FAGERGREN LABORATORY UNITS	S-H CLASSIFIERS
HMS PUMPS		THICKENERS
DENSIFIERS	HYDROSEPARATORS	SAND PUMPS
CONE SEPARATORS		CONDITIONERS
DRUM SEPARATORS	HMS LABORATORY UNITS	

Western States

Mining Association to Meet

November 30 and December 1 are the dates for the 57th annual convention of the Northwest Mining Association, to be held in Spokane, Wash. An information-packed program is being arranged by E. C. Stephens, Association president, and a special committee.

Alexander Mine

Work on a 300-ft tunnel is progressing at the Alexander property in the White Mountain district, Esmeralda county, Nev., owned and operated for silver-lead-zinc values by Leo Coleman of LaFayette, Calif., and Molini Bros., former Tonopah mine operators. Completion of the tunnel will facilitate ore development at an approximate depth of 150 ft, about 50 ft below the bottom of the present shaft.

Open New Tunnel

Kimball Mines, Inc., in the Treasure Mountain mining district of Powell County, Mont., has completed a new lower tunnel 111 ft long. This tunnel has reached the ore body at a depth 100 ft greater than the upper opening and is in a silver, gold, zinc and copper ore body in which ore has been blocked out and some stockpiled pending the erection of a small mill.

Placer Property Leased

L. W. Loomis, Placerville, Calif., mine operator and one of the owners of the Loomis-Lange lode gold property operated under lease by the Volo Mining Co., reports he has recently leased his Nigger Hill property to William Milbrandt of Oregon. The mine is three miles east of Placerville and in an area where numerous rich placers were operated in earlier days. Milbrandt is extending a tunnel into virgin ground.

Hints For Uranium Hunters

A complete report on possible mineral deposits in the intermountain west is now available for study by uranium prospectors, the U. S. Geological Survey recently announced. Interested parties must travel to the Atomic Energy Commission offices in Grand Junction, Colo., to see the reports. The agency has drilled more than 500,000 ft of test holes around the Colorado plateau to compile its study, and the results are described as an important guide to mineral seekers, prospectors and others.

Mining Tungsten Ore

The Nevada-Massachusetts Co. is milling 350 tons of scheelite daily at its mine in the Mill City district near Winnemucca, Nev. The ore comes from the Humboldt, Stand and Sutton shafts and six open-pit mines. One of the foremost producers of high-grade tungsten ore in the country, the company employs about 200 men. Ore has been developed to a depth exceeding 1000 ft while extensive deposits are mined in shallow workings with power shovels.

To Study Phosphate Deposits

Continental Sulphur and Phosphate Corp. of Dallas, Texas, has made funds available for studying phosphate deposits in the Lander, Wyo. area. The money will be used by the University of Wyoming's National Resources Research Institute to develop commercial phosphate deposits. A previous gift of $10,000 has been given by the corporation.

Utah Coal Tunnel Progress

Rapid progress during May in driving a tunnel through sandstone at Sunnyside, Utah, for the coal operations of the Kaiser Steel Corp., has been reported by Centennial Development Co., the contractors. Working two shifts, 560 ft of a 9 x 12 ft tunnel were driven in 29 days with a crew of 10 men.

Little Pittsburg Developing

The recent labor dispute disrupted, temporarily, development at the Little Pittsburg Mine on Pine Creek in Idaho. An ore body has been opened on the No. 9 level at the Mascot Mining Co. property with a vein showing of 23 ft laced with 15-in. streaks of silver-lead ore.

SANTA FE TANK & TOWER CO.

Welcomes

The American Mining Congress

Consult with us on wooden mining tanks, cooling towers, wooden pipe, pole cross arms, etc.

SANTA FE products give performance, durability, and economy—backed by many years' experience in the field of wood engineering.

SANTA FE TANK & TOWER CO.

54th & Boyle * Telephone Lafayette 0194 * Los Angeles 58

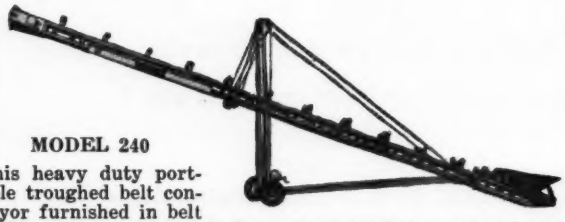
GET THESE "*HI-SPEED*" FEATURES

- "Standardized" Units usually shipped from stock.
- "Job-Fitted" . . . order assemblies to meet your requirements.
- Set up on the site in a few hours time.
- Bridge-like design—braces welded in correct position for maximum strength.
- Constructed to conform to strictest engineering practices.

AND DEPENDABLE "*HI-SPEED*" SERVICE

Baughman HI-SPEED Conveying Equipment is the result of practical experienced engineering—proven in operation. It will meet exact requirements, increase output and reduce operating costs. Baughman "Standardized" production methods cut equipment expenses. Quality materials and expert construction minimize maintenance costs. We welcome the opportunity to study your material handling problems . . . there is no obligation.

1. Conveniently located distributors from coast to coast.
2. Conveyors shipped in sections for lower freight costs.
3. Standardized construction . . . replacement parts immediately available.



MODEL 240

This heavy duty portable troughed belt conveyor furnished in belt widths of 24 and 30 inches. Assembled from Baughman "Standardized" units to meet material and capacity requirements. Mast type hoists recommended for conveyors from 50 to 70 feet long. Available with Swivel Wheels for easy maneuvering, etc. (Special order only.)

Write for free Catalog No. 57 for full information and engineering data or see your nearest Baughman Distributor.

If It's *HI-SPEED* . . . It's *BAUGHMAN*

BAUGHMAN

manufactured by
BAUGHMAN MANUFACTURING CO., Inc.
94 ARCH ST., JERSEYVILLE, ILLINOIS

WILFLEY
CONCENTRATING TABLES
offer these advantages . . .

1. Variable speed control—200 to 400 RPM.
2. Adjustable stroke length—¾" to 1¼".
3. Choice of riffle design.
4. Table deck 7' wide of selected California redwood on white pine frame reinforced with steel—light and strong.
5. Deck covering of special sheet rubber.
6. Table frame of channel steel with oil immersed rocker bearings and positive tilting mechanism for any slope up to 2" per foot.

THE WILFLEY TABLE is an economical and efficient means of gravity concentration particularly suited to coal preparation requirements. The simple mechanism cuts upkeep. Our engineering staff is at your service. *Write Direct.*

OTHER MASSCO PRODUCTS

Marcy Ball, Rod and Tube Mills; Massco-Grigsby Rubber Pinch Valves; Density Controllers; Massco-Fahrenwald Flotation Machines; Belt Feeders; Laboratory Crushers and Pulverizers.

THE *Mine & Smelter* SUPPLY COMPANY

1440 17th Street, Denver 2, Colo.
Sales Offices in Salt Lake City, El Paso, 1775 Broadway, N.Y.C.

BEAR BRAND XANTHATES

FOR OVER 25 YEARS

THE STANDARD

FLOTATION REAGENTS

DOW

THE DOW CHEMICAL COMPANY

SAN FRANCISCO 4, CALIFORNIA

LOS ANGELES SEATTLE

To Reopen Chrome Mines

The Benbow and Mouat chrome properties in Stillwater County, Mont. may resume operations this year. These properties produced more than 100,000 tons of chrome concentrates during World War II. It is reported that Chromium Mining and Smelting Corp., Ltd., Canada, has been negotiating to acquire the Benbow properties. Goldfield Consolidated Mines Co. of Reno, Nev. and San Francisco, and others are reported to have acquired the Mouat claims, which they expect to operate with the aid of a government loan.

Study Uranium Occurrence

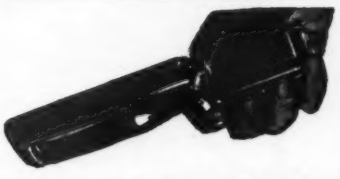
Samples of ore taken from the Copper King Mine 45 miles northwest of Fort Collins, Colo., have been examined by the Atomic Energy Commission and found to contain pitchblende. It is too early to tell whether or not this find will be of importance as a uranium source since the size of any deposit rather than the presence of pitchblende or the assay of any particular sample is the deciding factor. The Commission is following with interest the development of the mine by its owners. The Copper King is one of a number of prospects in the Colorado Front Range which geologists of the Commission and the U. S. Geological Survey are studying to learn more about the occurrence of uranium. Attempts are being made to relate the known occurrences of pitchblende in this area to the various complex geologic formations in which they are found. By these studies, it is hoped to develop guides for use in further exploration. The AEC believes that the Copper King discovery will furnish some of this needed information.

Mining Company Liquidated

Recently the Mountain City Copper Co., Salt Lake City, announced that its liquidation was completed with original shareholders receiving a total of more than seven times their investment. The final dividend amounted to a fraction more than 21 cents per share for a total disbursement of $499,234.

Old Shaft Reworked

James O. Greenan, Reno mine operator, and associates are preparing to install machinery on an old lead-silver mine three miles north of Gabbs, Nev., preliminary to reopening of an old shaft and underground mining operations. Dump ore will be shipped to a smelter.



WELCOME!

AMERICAN MINING CONGRESS CONVENTION!

Be sure to take time out to visit our laboratory and plant in South Pasadena, only a few minutes' drive from your downtown Biltmore Hotel convention headquarters.

Let us take you through our plant, show you how ultra-violet Mineralight lamps are made, demonstrate how easy it is to make positive mineral identification with Mineralight. Or rent a Mineralight lamp, take it along with you on a field trip while in southern California. See for yourself how ultra-violet can help you. We have loads of literature, free for the asking and sure to be interesting!

We'll look forward to seeing you

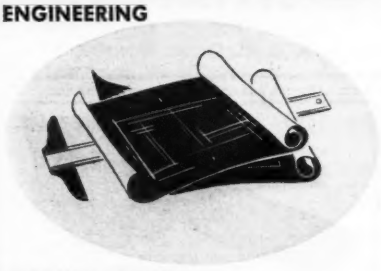
ULTRA-VIOLET PRODUCTS, Inc.

145 Pasadena Avenue, South Pasadena, Calif.

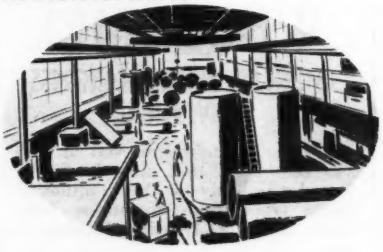
SERVING THE MINING INDUSTRY

THE SWECO SEPARATOR

ENGINEERING



MANUFACTURING



CONSTRUCTION

Here is a SWECO product, proven in principle and application, that is attracting great interest in the mining industry. This single or multi-deck vibrating screen employs an entirely new screening motion. No substructure vibration. Unit can be mounted on skids, wheels, top of bins, wood floors, etc. It produces greater production capacity, handles wet or dry materials and involves only three moving parts. Laboratory accurate, classifying and dewatering up to 325 mesh on a production basis. Screen cloth life is guaranteed, as is lowered maintenance and power requirements. Investigate this latest SWECO development for the mining industry.

For years, SWECO has been favorably known for its Pre-fabricated Heavy Media Separation Plants, designing, fabrication and construction work, together with a complete Mining Metallurgical Laboratory serving the mining industry.

Southwestern Engineering Company

SWECO

4800 SANTA FE AVE., LOS ANGELES 58, CALIF.

SAN FRANCISCO • PORTLAND • SEATTLE • VANCOUVER
PITTSBURGH • CHICAGO • NEW YORK • ATLANTA • WASHINGTON, D.C.

Developing At Sidney

Sidney Mining Co. has opened the vein system of the Sidney mine, Kellogg, Ida., on the 1100-ft level and reports the ore showing equal to anything found in the upper workings, judging from a crosscut section of the vein. Sidney is mining and milling from a vein in the upper workings which has a known length of over 1000 ft and a width up to 15 ft.

Dewatering Costs Defrayed

E. B. Smith, Raymond, Calif., has leased the Daulton copper mine from L. M. Bradford. Located about 15 miles east of Madera, Calif., the mine has produced little during the past 50 years, but it was a large copper producer in the 1800's. Three diamond drill holes, drilled in 1946, have established the presence of a complex copper-zinc-lead sulphide ore body.

To help defray dewatering expenses, copper is being precipitated from the mine water by electrolytic reaction with scrap iron. The iron dissolves while the copper collects in the bottoms of 18 redwood tanks. Periodically the copper is removed, dried and sacked for shipment.

Lead Mine Sold

Anaconda Copper Mining Co., of Butte, has made a down payment of $500,000 on a $2,000,000 deal for the Bonanza lead mine at Bossburg, Wash., owned by Earl B. Gibbs and Ira M. Hunley, of Spokane, formerly operators of the Daddy, Mother Lode and Golden Chest gold mines at Murray, Idaho. Gibbs and Hunley had moved a milling plant from Murray to Bossburg after purchasing the Bonanza mine, which had been abandoned for years.

Booth Tunnel

Driving of a 400-ft tunnel is reported progressing at the Booth gold property in the old Cimarron district, about 30 miles north of Tonopah, Nev. The mine was acquired early this year by Chicago interests who installed a Diesel engine, compressor, mechanical mucker and other machinery units. The crosscut tunnel is expected to locate downward extensions of the veins mined in upper workings.

To Mill Cobalt Concentrates

Calera Mining Co. (subsidiary of Howe Sound Co.) has begun tuneup operations in its new milling plant at Cobalt, Idaho (formerly Forney), concentrating cobalt from the first major sized deposit of this strategic mineral found in the United States. The cobalt concentrate is being stockpiled pending completion of a cobalt refinery

by Howe Sound at Garfield, Utah. By-product copper concentrate will be shipped directly. Under intensive development for several years, the company's Blackbird mine has enough cobalt ore exposed to insure a large operation.

Nevada Gold Strike

Gold ore reported on the Peterson claims near Horsethief Spring, east of Tonapah, Nev., is attracting much interest. A ledge was found at the surface by Mangus Peterson, Nevada prospector and mine operator. About 30 ft has been exposed by trenching to a depth of about 16 ft. It carries gold-silver ore 6 to 12 in. wide in a series of small veinlets. Numerous veins varying in width from a few inches to 10 ft have been found in the area, in an altered rhyolite formation. Indications are reported promising for development of important ore bodies on the Peterson and adjacent claims.

Purchase Destroyer Claims

Metropolitan Mining Co., Wallace, Idaho recently purchased the Destroyer group of 11 unpatented claims on Big Creek immediately adjoining Metropolitan on the south. Sunshine Mining Co. is continuing its prospecting through Metropolitan ground by driving a crosscut on the 3100-ft level and has advanced the work 3566 ft. The only vein of importance so far encountered is the Yankee Girl, 1000 ft south of the Sunshine vein.

To Mine Steatite

Work has been started on a 21¼-mile electric transmission line to serve the mine of the Sierra Talc and Clay Co., a new industrial enterprise in the Ennis, Mont., area. The project was announced by Harold K. Near, division manager of the Montana Power Co., which is constructing the line.

Sierra Talc and Clay Co., of Los Angeles, recently took over the operation of the mine, which has been shut down for some time. Steatite talc mined at the site will be used in making high grade porcelain insulators.

Another DMA Loan Granted

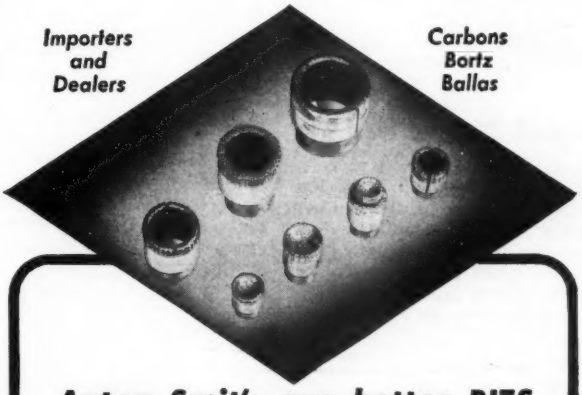
Day Mines, Inc. has been granted a $288,000 government loan from the Defense Minerals Administration for deep prospecting of the King group north of Mullan, Ida. This group consists of mining claims extending from Burke, Ida., to the Snowstorm mine, a distance of about seven miles. The Day Co. has recently purchased the Hunter mine at Mullan, and a continuation of the mile-long Hunter crosscut would gain a depth of about 3000 ft on the King group.

Donner Mine

Shipments of copper ore are being made from the Donner mine in Calaveras County, Calif., on the west belt, 25 miles southeast of Campo Seco. The operation is run by Ronnie B. Smith of Dallas, Texas, who has completed a two-compartment shaft 100 ft deep on a vein of copper-zinc ore 16 ft wide. The ore body is similar to that of the Penn mine, nearby. Smith has leased the Mountain King mill, located near Hodson, and expects to operate it on ore from the Donner mine making separate zinc sulphide and copper sulphide concentrates. Roy G. Mead of Glendale, Calif., is consulting engineer and is in charge of all operations. Howard Castle is mine foreman.

Perlite Property

Perlite deposits in the Seven Troughs district near Lovelock, Nev., and a tungsten property in Black Canyon have been acquired by Warren Petroleum Co. of Los Angeles from Charles Chester of Lovelock. Perlite claims cover 160 acres and the tungsten property includes five lode claims. Vigorous development of the scheelite deposits is reported planned.



Anton Smit's are better BITS

The DIAMOND BITS of Anton Smit & Co., Inc. are the best bits because:

1. They have been steadily improved over a 20 year period...
2. Using a Tag-And-Report system whereby the history in use of Anton Smit Diamond Bits is traced, known and employed in further perfecting them...
3. Resulting in superior features, such as the Anton Smit powdered metal matrix that insures even wear and diamond economy.
4. The international scope of our business assures the widest selection of industrial diamonds scientifically chosen for specific uses — the best possible diamonds and matrices for every type of formation and usage—at rock bottom economies.

Informative booklets sent free on request.

Est. 1908 **ANTON SMIT & CO., Inc.**

333 W. 52nd St., New York 19, N. Y. Cables: PROFITABLE, New York

Be sure to see our representative at the

AMERICAN MINING CONGRESS,

Registered at the

HOTEL BILTMORE, LOS ANGELES, OCT. 22-24

Sample bits will be on hand for your inspection.

New Building At Montana Mines

Plans for the tenth building on the campus of the Montana School of Mines are expected to be ready some time late in August, according to Dr. J. R. Van Pelt, president of the school. The structure will be known as the Physics and Petroleum Building and is expected to be ready in September 1952. Need for the building has been recognized for the past five years since the department of petroleum engineering was established.

Dry Creek Claims

Development of lead-copper-zinc properties in the Dry Creek area near Nevada City, Calif., has been started by Vincent LeSage of Los Angeles. Three veins have been found in the group of claims, owned by Mrs. Paul Rossier and Luke Williams.

A 40-ft shaft has been dewatered and will be repaired before it is deepened.

Construct Bentonite Plant

Construction of a bentonite processing plant north of Greybull, Wyo., has been started by the Magnet Cove Barium Co. Lee Grenier, Greybull area manager for the company, has said that the plant is expected to be in operation by this fall. The bentonite will be taken from an area east of the plant across the Big Horn River, transported across the river by a tramway and unloaded right at the plant. Work has already begun on the tramway and a railway spur to the plant.

Report Cobalt in Nevada

Cobalt ore has been reported north of Goodsprings, Nev. W. Scott, assayer and prospector, who made the discovery, reports that operations will be undertaken at the deposit by Harlin, Inc., of New Jersey. The metal is in demand for many industrial uses.

East Utah Starts Project

East Utah Mining Co., an affiliate of New Park Mining Co., has started work on an exploration project in the Park City district of Utah, Clark L. Wilson, mine superintendent for both companies, has announced. The program is divided into two projects, both off the old General Connor tunnel.

One calls for 500 ft of drifting and cross cutting toward the northeasterly extension of the contact fissure from the Mayflower system. The other involves 2500-ft of cleanup and maintenance and 1500 ft of drifting and crosscutting to the easterly extension of the McHenry fissure. Both projects will be carried on simultaneously.

ECONOMY CONCENTRATING TABLE

Featuring the unique principle of reverse riffle for better recovery, cleaner concentrate and lower water consumption. Dur-

able redwood construction . . . easy to install and adjust . . . positive head action . . . portable . . . light weight.

Let us arrange demonstration for you at our plant during Convention week.

GORDON S. DUNHAM
Manufacturing and Sales Co.
853 Mission St.
So. Pasadena, Calif.
Phone—PYramid 1-1002

Plans Small Mill

Albert M. Nash, who has for a number of years been in charge of the Hope silver-lead mine at Clark's Fork, Idaho, is head of a new mining company, the Black Horse-Paragon, taking over the old Black Horse and Paragon mines in the Murray district. Nash plans construction of a small mill to handle low-grade ores from old dumps while new mine development is in progress. The mill will also be available as a custom plant to prospectors and other small producers.

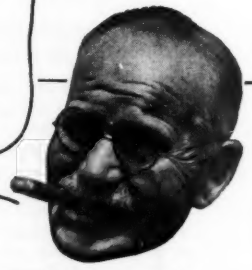
Sheehy-Strand Tungsten Mines

Industrial Mines Corp. has started work on the Sheehy-Strand group of tungsten claims in the Gabbs-Rawhide area of Nevada, leased recently from Dick Sheehy of Yerington, Nev., and William Strand of Fallon, Nev. Robert Stewart, official of Industrial Mines, said a three-month development program will be vigorously pressed, and a concentrating plant installed if deposits prove as extensive and valuable as expected.

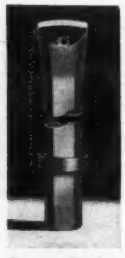
Summit King Mine Closes

Another Nevada gold mine has been closed down because of high costs. Summit King Mines, subsidiary of Bralorne Mines, Ltd. of British Columbia, has made the last cleanup of its mill at the Dan Tucker mine in the Sand Springs area east of Fallon, Nev. Manager P. G. Dobson stated some ore remains in the mine, but the operation is no longer profitable. The mill, designed to handle 75 tons of gold-silver ore daily, may be remodeled to handle scheelite from properties in the Gabbs Valley and Rawhide districts.

Bigger days drilling at *LESS COST...* When we use tungsten *CARBIDE ROK-BITS!*



Flat-top Carbide Bit. Gauge sizes: 1¾ to 4"



Intraset Steel. Chisel or 4-point

With all the work there is to be done can you afford to waste manpower on inefficient bits? Rock Bit Sales & Service Co., 2514 E. Cumberland St., Philadelphia 25, Pa., *Branch: 350 Depot St., Asheville, N. C.*

Manufacturers of complete line of pneumatic tool accessories. Request literature.

INTRASET DRILL STEEL: 2-point, chisel or 4-point, cross-type—gauge sizes: 1¼ to 2¼".

ROCKBIT
SALES AND SERVICE CO.

Dredging Gold

Fairview Placers is dredging about 7000 cu yd of gravel daily in an area two miles north of Lewiston, Calif. Gold recovery is reported varying from 800 to 1000 oz a month. The company bought the dredger, equipped with nine-cu ft buckets, from Junction City Mining Co., moved it to its present location in 1949, replaced the old riffles with modern jigs and started production in September 1950. The deposit is about 25 ft deep on a schist bedrock.

Nevada Fluorspar Discovery

A fluorspar deposit has been discovered by Henry Schwabrow and Marion Schendel in Black Canyon, near Lovelock, Nev. Overburden stripped from the deposit by a bulldozer disclosed the ore body, described by a Bureau of Mines engineer as 80 ft wide and more than 300 ft long. The property is four miles from a Southern Pacific Railroad siding, three miles from a Sierra Pacific electric power line, and can be reached by two roads.

First Uranium Bonus

Announcement that the first five uranium mines to receive the special bonus for new mines which have been certified, was made early in September by the Atomic Energy Commission at Grand Junction, Colo. The special bonus, which equals the basic payment per pound of uranium oxide in each ton of ore, applies to the first 10,000 lb in ore containing 0.1 percent or more uranium oxide shipped since March 1, 1951 and will go to five mines; three in Utah and two in Colorado.

The Utah mines are: the Abe Day Vanadium Queen claim in the LaSalle district, San Juan County; Loyal A. Sutherland's Socko claim in the Yellow Cat district, Grand County; and Eli Malich's Lucky Day claims, also in the Yellow Cat district. The Colorado claims are: J. W. Gramlich's Star claims in Montrose County and Dan E. Kelley's claims in the Calamity district of Mesa County.

California Asbestos Shipped

California's first carload of asbestos was shipped recently from the Loma Blanca mine near Redding, Calif., to Powhatan Mining Co., Baltimore, Md. The mine is operated by Homer Fenn and the material was purchased by the western representative of Powhatan, a manufacturer of asbestos products. The mine is situated in an area where exploration and development of asbestos deposits has been progressing for months. Other properties are active and some reports of chrysotile have been made.

Park Utah Tunnel Progress

Park Utah Consolidated Mines Co. will extend their 1400-ft crosscut on the 2100-ft level of the Ontario drain tunnel in the southern portion of its Park City Utah mines. An additional 300 ft of crosscutting to the south is scheduled after which the firm will drift on any new fissures found.

Meanwhile preparations are being completed for work from the Star of Utah tunnel from which the firm hopes to drift, and intersect an extension of the old Naildriver ore shoot about 1200 ft below the collar of the Naildriver shaft. Naildriver Mining Co. is controlled by Park Utah.

Nevada Iron Property

Utah Construction Co. has leased four potential iron producing properties in the Cortez Range near Beowawe, Nev., and one in the Jackson Range in Humboldt County from Iron King Adventures, Inc., and is preparing installation of machinery for exploratory and development work.

THE DOOR IS OPEN
for faster drilling
Liddicoat detachable rock bit is used to destruction — no re-sharpening. This one factor provides fast cutting performance and long cutting life with a low initial cost per bit and lowest cost per foot of hole drilled. Since re-sharpening is not involved it has been possible to design the bit for maximum drilling efficiency.
Liddicoat actually chips out the rock instead of battering it until it is pulverized, as is the case with conventional bits. This is the accomplishment of the two stage cutting action and the special wing design which retains sharp cutting portions for the life of the bit.
Test — and then you too will join the ever expanding list of satisfied Liddicoat customers representing many of the world's largest mining and contracting concerns.
B
A
A
B
AA
BB
Section "AA", along the high-centre wings. Section "BB", along the low-centre wings.
"EVERY LITTLE BIT COUNTS"
WESTERN
Rock Bit Manufacturing Company
552 West 7th South • Salt Lake City 4, Utah

OSGOOD

Model 1000 gives you more of all four:
Speed - Strength - Stability - Stamina!

In all four — speed, strength, stability, and stamina — OSGOOD Model 1000 2½-cu. yd. Shovel gives you more. FOR SPEED: OSGOOD Air Control with OSGOOD Air Cushion Clutches. Hoisting, crowd and retract, swing, travel motions, and boom hoist are all controlled by air-metering valves that provide right "feel" for each operation. Response is instant, velvet smooth. FOR STRENGTH: Crawler base and full-length deck, each of heavy, unit-cast steel; box girder type all-steel boom; all parts of machine are sturdily designed and precision built for longer life. FOR STABILITY: Wide crawler base; deck machinery located so weight is well behind center of rotation; six hook rollers keep superstructure level on crawlers. FOR STAMINA: Powerful Caterpillar D-17000 or Buda 6-DC-1879 engine. Model 1000 converts quickly from shovel to dragline, clamshell or crane. Write today!

•

See OSGOOD at American Mining Congress Convention
Biltmore Hotel, Los Angeles, October 22-24

•

EQUIPMENT DESIGNED WITH YOUR PROFIT IN MIND

MEMBER PCSA

5147

The OSGOOD COMPANY
MARION, OHIO
AFFILIATED WITH THE GENERAL EXCAVATOR CO.

POWER SHOVELS, CRANES
DRAGLINES, CLAMSHELLS
PILE DRIVERS & BACK HOES
CRAWLERS & MOBILCRANES
DIESEL, GASOLINE OR
ELECTRIC POWERED

Grey Eagle Tunnel Extended

Extension of No. 6 tunnel is progressing steadily at the Grey Eagle lead-silver mine in the Tenabo district near Beowawe, Nev. It has been driven 125 ft from the 500-ft mark during the past six months and is being continued toward an ore zone approximately 400-ft distant. Ore disclosed there last winter by a winze below the Hovendoen tunnel showed lead-silver-gold-copper-zinc values.

Present plans call for the eventual extension of the tunnel for about 1400 ft to permit exploration and development of the Sands Sutton and Tripplet deposits, producers of silver-lead ore in earlier days. Mine equipment includes a blower and mechanical mucker. The mine was leased last year from Charles E. Roberts by Grey Eagle Development Co. Erection of a selective flotation mill is planned when ore development warrants.

Alaska Project

Preliminary work is being done by Zenda Gold Mining Co. on a property in Alaska where the company hopes to recover tin by dredging. Defense Minerals Administration recently approved a grant to the firm for exploratory and test drilling work. The area is located on Cape and Boulder creeks in the Port Clarence mining district of the Seward Peninsula, 100 miles from Nome.

New Idria to Reopen

Plans to reopen the New Idria quicksilver mine near Hollister, Calif., are reported by the new management of the company. The mine was operated on a major scale during both world wars and has produced more mercury than any other American property. Encouraged by price advances operators of quicksilver mines in Lake, Sonoma and other counties of California are reported resuming activities.

Chief Consolidated Shipping

Lead-zinc ore is being shipped from development headings on the 2600-ft level in the Chief Consolidated Mining Co.'s property in Eureka, Utah, Cecil Fitch, Jr., vice-president and general manager, has announced. The company has encountered ore in two places on the 2700-ft level.

Placers to Operate

Arrangements have been completed by George Daly and Leslie G. Allen for extensive drilling of 10 placer gold claims near Pigeon Springs in the Palmetto district near Goldfield, Nev. Installation of a dredger and power plant is scheduled by October if tests disclose satisfactory amounts of profitable gravel.

Open Independence Mine Soon

The Independence mine, in the Buzzard Hill region, near Happy Camp, Calif., will soon be in operation. Rehabilitation crews are working on a two-shift basis, machinery is on the spot and a considerable amount of ore is reported exposed in old workings. The Independence was operated almost continuously from 1853 to about 1935, and reopened briefly in 1941.

Wasatch Drain Tunnel

Ore showing silver-lead-copper values is being produced by Zenda Gold Mining Co. from the Wasatch drain tunnel in the Little Cottonwood district at Alta, Utah, company officials have reported. The project, being carried on under lease agreement between Zenda and Wasatch Mine Co., calls for a 500-ft extension of the tunnel and deepening of the winze on the No. 3 ore body 4000 ft. The Wasatch Drain Tunnel, opened in 1915, has not been worked since 1924.

Nevada Sulphur Venture

Sulphur production from deposits near the Western Pacific RR, 60 miles north of Lovelock, Nev., is scheduled by Black Rock Desert Mining Co. of San Francisco. Preliminary arrangements have been made and construction of a 250-ton plant is expected to start soon.

Fire Damages Uranium Lab

The Vanadium Corp. of America's uranium processing plant at Durango, Colo. was recently damaged by fire of undetermined origin. The blaze was confined to a sampling laboratory and an office, according to W. L. Hildebrand, general superintendent. Most of the equipment in the laboratory was saved and most of the records, although water soaked, could be salvaged.

Prepare Montana Coal

Blair-Collins Coal Co.'s new coal preparation plant at Keene No. 2 mine, 25 miles east of Roundup, Mont., has been completed and placed in operation. Coal is trucked four miles from the mine to the cleaning plant and crushed before being sized.

Plan Domestic Tin Mine

Production from a cassiterite deposit is projected in the Trona region of California by Donald F. McGrew & Associates if DMA approves a loan to finance development and equipping of the property. Preliminary investigation by engineers indicate it is probably the richest deposit in the country, and McGrew reports that when in full operation the property should be able to produce 4800-7200 tons of ore daily. Tentative plans call for employment of 80 men.

Talc Mined in Montana

Sierra Talc and Clay Co. of Los Angeles has taken over the Mountain Talc Mines, located south of Ennis, Mont. The steatite talc produced is used for insulators in electronic instruments. The Montana Power Co. will furnish electric power for the operations and work has been started on a 21-mile transmission line.

BOOK REVIEW

THE BUSINESS EXECUTIVE'S HANDBOOK, *Third Edition, Edited By Stanley M. Brown and Lillian Doris, Prentice Hall, Inc., New York, 1951, $7.50, 1600 pp.*

A compilation of practicable, usable business knowledge, this book contains seventeen sections which cover such subjects as:

- Business letters
- Sales contracts and forms
- Business insurance
- Office management
- General partnerships
- Corporate meetings, minutes and resolutions

Each chapter has several samples of application and practices of the topic discussed. Wherever useful, charts and tables illustrate the text material.

Referenced for quick use, the handbook is of value to all business men but especially to the small operator who has no staff of experts and must rely upon his own knowledge of the fine points of business.

TECHNICAL LIBRARIES, THEIR ORGANIZATION AND MANAGEMENT, *Lucille Jackson, Editor, Special Libraries Association, New York, 1951, $6.00, 202 pp.*

In this day of technology it behooves a forward looking firm to keep a library of all technical papers pertinent to the services of the company. To assure that all material is properly taken care of, that items are not lost, misplaced or technological work duplicated, a library should be something more than a filing cabinet.

Here is a book which tells in detail what the organization and operation of such a library includes. While, because of its scope, this volume may be of interest only to operators of larger companies, it is of particular interest to them. Separate chapters describe fully such library functions as: duties and qualifications of the staff; documentation processes; reference procedures; literature searches; and administration of some routine services.

WILD
HEERBRUGG

For Greater Accuracy at Greater Speed in Mining Surveys.

WILD T-1 OPTICAL REPEATING TRANSIT.

Readings direct to 1 minute and to 6 seconds by estimation with time-saving optical micrometer. Built-in optical plummet for easy centering of instrument above tack.

ACCESSORIES AVAILABLE

Electric illumination for circles and reticle.
Vertical collimator for tunnel and shaft work, interchangeable with leveling base of T-1.
Diagonal eyepiece set for Zenith observations.
Illuminated targets, interchangeable with leveling base of T-1.
Objective prism for transferring horizontal lines by 90 degrees in any direction.

With 30 years experience in optics and instrument making, WILD is a by-word for accuracy, craftsmanship, sturdiness and durability.

Complete Repair & Servicing Facilities by Factory Specialists!

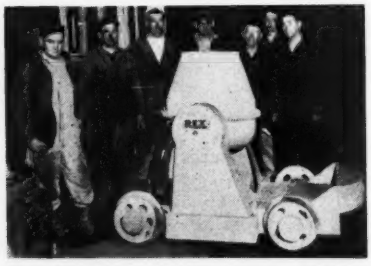
Phone or Write for BOOKLET MCJ 10

HENRY WILD SURVEYING INSTRUMENTS
SUPPLY CO. of AMERICA, INC.
26 COURT STREET, BROOKLYN 2, N. Y. • TRiangle 5-0644

Manufacturers Forum

Track Mounted Concrete Mixer

'REX' Chain Belt Company of Milwaukee, Wis. has a versatile 3½S Tilter Concrete Mixer. The West Virginia Mine Supply Co., a REX Distributor collaborating with the Jamison Coal and Coke Co., both of



Farmington, W. Va., has created a "Train-Mixer with this 3½S Tilter for underground construction work. In Jamison's Mine No. 9, this profitable application has been used for air-passage construction, patchwork, and general mortar and cement mixing.

The REX 3½S Tilter Mixer was relieved of its portable axle mounting and put on its own truck made of 42 in. gauge mine car wheels. A 1½ hp, 250-volt dc century motor is used to furnish power to the mixer. The whole unit is moved from place to place by a mine locomotive.

Tractor Attachments

Three completely new heavy-duty attachments, designed to enhance the versatility of the Allis-Chalmers HD-20 Tractor, have been announced by The Baker Manufacturing Co., Springfield, Ill. Specifically built to work with the HD-20, the new Baker Bulldozers, Gradebuilders and Root Rippers are available in both hydraulic and cable-controlled models.

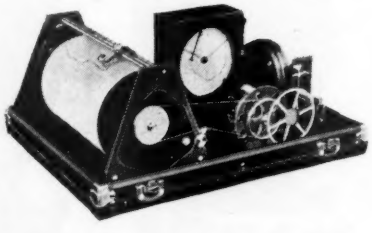
Claimed as the outstanding design feature of the new Baker attachments is the "fingertip control" achieved through the short linkage between the blade control lever and hydraulic control valve. The reduced number of working and wearing parts in the short hydraulic linkage enable the operator to feel the changes in blade position and maintain full positive control with greater ease; it also assures the maintenance of a high level of control sensitivity over the long working life of the equipment, the manufacturer says. Baker features of direct lift, positive down-pressure and positive hydraulic "hold" have been retained in the new hydraulic models.

Complete specifications on all Baker attachments are available from Baker-Allis-Chalmers Dealers or direct from the Baker Manufacturing Co.

Recording Micro Barograph

Perfected after years of laboratory and field research, an entirely new Recording MICRO Barograph has been developed by the American Paulin System, 1847 S. Flower St., Los Angeles, Calif. The barograph is constructed on the Nul or Zero-Gauging principle. All power in the actuating and recording mechanism is supplied by two heavy duty sealed instrument clocks and no power is taken from the pressure-sensitive device.

A pressure curve is recorded over a range of plus or minus 1.00 in.



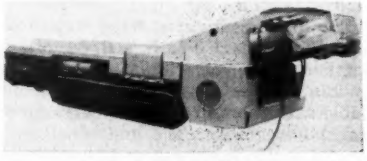
mercury and can be used at any elevation from sea level to 10,000 ft by means of a convenient reset. The 24-hour chart is graduated in intervals of 0.005 in. mercury, easily read to 0.001 in. mercury. Chart time is divided into intervals of 10 min., readable to one min. Curve is drawn on a specially surfaced paper by a metallic point and no ink is used.

Precision graphs are supplied with each instrument for the purpose of converting readings to the closest one ft elevation where instrument is used as a base recorder for altimeter surveys. This procedure makes unnecessary the current practice of maintaining a man at base.

Crawler-Type Shuttle Car

A new cable-reel crawler-type steel-track shuttle car for mine application has been announced by the Locomotive and Car Equipment Department of the General Electric Co. The new unit, designed for operation in close quarters, has a turning radius of from 14 to 16 ft.

Radically different from previous shuttle-car designs using rubber-tired wheels, the new unit provides for light ground-loading pressure per



square inch by distributing weight over a large area.

Because no clearance is required for turning wheels, a much wider conveyor is built into the body of the track-laying car for the same over-all width. Improved maneuverability is illustrated by the track-laying shuttle car's ability to turn by locking one track completely. Because of a wider conveyor, unloading speed is increased. Simplicity is stressed by the use of only two drive motors, one on each track.

The new 250-volt car is driven by two-sealed type, 20-hp, 250 volt series-wound motors driving each track through single gear reduction, chain and sprocket. The gear case is an integral part of the motor.

A spooling device controls level winding on the cable reel which is hydraulically driven, with sealed-type enclosure. The reel is equipped with 600 ft of No. 3 two-conductor cable with ground wire. Guides permit reeling in either direction. The hydraulic motor torque is automatically compensated for reeling and unreeling cable pull.

Two steering levers at the operator's position operate the tracks. They are connected to the traction motor power circuits and to hydraulic brake valves. By moving a steering lever forward a few degrees, the corresponding traction motor is disconnected from the line, and the car turns slightly.

Light Spur-Gear Hoist

The Challenger, a spur-gear hoist incorporating new design innovations, is now in production in ½- and 1-ton capacities, according to the manufacturer, Coffing Hoist Co. of Danville, Ill. The entire unit, including standard length of high-strength coil chain for an eight ft lift, weighs only 39½ lb.

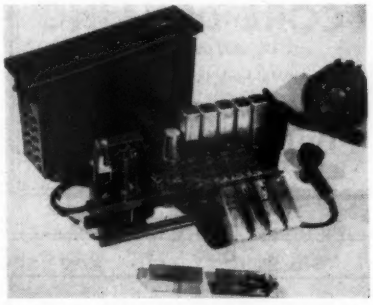
Strength and unusual resistance to shock-load breakage are said to be gained by the use of formed steel plate in the housing in place of the more common cast aluminum alloy. The back plate is laminated to give extra rigidity for supporting the hoist mechanism. This plate and all other load holding parts are of high-strength steel that will hold five times the rated capacity of the hoist, according to the manufacturer.

Further information on the new unit is available from the Coffing Hoist Co., 800 Walter St., Danville, Ill.

New Trolleyphone Features Packaged Maintenance

A late development in coal mine communications—a new type Femco Trolleyphone—should be a boon to harassed mine men now charged with meeting high production schedules for National Defense as well as the civilian economy, according to the manufacturers, Farmers Engineering and Manufacturing Co., Pittsburgh, Pa.

Featuring "packaged maintenance" the newly designed Trolleyphone has its FM carrier circuit "packaged" in plug-in components for quick change —by anyone—in case of communication interruption. No technicians are needed; anyone can service the new



unit by replacing plug-in components with numbered spares until communication is resumed.

Using no signal wires, the Trolleyphone operates by feeding FM carrier current into the mine power system. Heart of the unit is the transreceiver containing the resistors and circuit—now "mechanical" in makeup by using ten convenient component parts units that plug into octal sockets like radio tubes.

Weighing but 50 lb and consisting of shock-mounted transreceiver in a heavy case, loudspeaker and press-to-talk microphone, the new design Trolleyphone is tailored to the needs of the individual mine operation and has the ability to withstand the most severe vibration during rugged mine use it is reported.

Drills Hard Mine Roof

A new tungsten carbide insert bit that rotary drills hard mine roof has been developed by Kennametal Inc., Latrobe, Pa. Materials that it can drill successfully include hard shale, hard slate, and laminated sandstone. A special feature of the new bit, Style HFD, is a recessed slot in the cutting edge that eliminates a point of zero velocity and permits faster drilling speed. This feature also allows it to drill farther between resharpenings and adds, according to some operators, several hundred feet to total footage per bit life.

Shank and body construction features permit its use where wet drilling is required. Channels down two opposite sides of the shank and a modified base allows water to pass around the bit and onto the cutting edge.

Primary advantages are: (1) Smooth hole wall, (2) Uniform gage for long footages, (3) Minimum bit cost in roof that can be rotary drilled, (4) Easy reconditioning.

Bit sizes range from 1¼ in. to 1½ in. in increments of 1/16 in., and from 1½ in. to 2¼ in. in increments of 1⅛ in.

—*Announcements*—

J. Peter Brehm has been named district sales representative in the San Francisco area for the Woven Wire Fabrics Division of **John A. Roebling's Sons Co.** The announcement was made from the division's main plant at Roebling, N. J., by Samuel K. Hornor, manager of sales.

Henry N. Marsh, formerly manager, smokeless powder division of the explosives department of **Hercules Powder Co.,** has been placed on a special assignment in the sales research division. **Frederick M. Hakenjos** has been appointed to the newly-created post of manager of smokeless powder sales.

Elevation of **Paul W. Arnold** and **Richard A. Geuder,** two engineers of **The Reliance Electric & Engineering Co.,** to new responsibilities in the company's general sales organization was announced recently by E. E. Helm, sales vice-president.

Arnold has been named to the newly created post of executive assistant to the sales vice-president.

Geuder is now manager of a new department of Applied Engineering and Industry Sales, the latter representing a consolidation of other specialized activities, including Contract Sales, Federal and Marine Sales, and general industry applications.

Walter G. Davis has been appointed purchasing agent for the Bemeco, All-State, Kentucky-Virginia, Western Kentucky and Anthracite Divisions of **National Mine Service Co.,** according to R. D. Allison, general purchasing agent. His headquarters will be in Beckley, W. Va.

Davis joins National Mine with several years of experience as supervisor of the purchasing departments of Gay Coal & Coke Co. and Gay Mining Co., Mount Gay, W. Va. For ten years prior to this he was associated with the Carbon Fuel Co., Carbon, W. Va.

Export traffic section of the **American Car and Foundry Co.'s** sales department has been merged with the general traffic department, according to an announcement by J. B. Krumech, traffic manager. **S. F. McDermott** continues in charge of export traffic and in addition has been appointed assistant to traffic manager. His headquarters remain at 30 Church Street, New York.

CATALOGS AND BULLETINS

CABLE REEL SHUTTLE CARS FOR LOW COAL. *Goodman Manufacturing Co., Halsted Street and 48th Place, Chicago 9, Ill.* Bulletin CLTS-512 describes Goodman's 35 in. high, four-wheel drive shuttle car for low coal. Designated as the type 370-371, it has an inside turning radius of 8 ft 1 in. and an outside turning radius of 18 ft 9 in. Copies of the bulletin will be sent on request.

INDUSTRIAL ROLLER BEARINGS. *Schafer Bearing Corp., 801 Burlington Ave., Downers Grove, Ill.* This is a new catalog to supersede older literature and contains illustrations and descriptions of Schafer products. Complete engineering and load rating data, along with illustrations of many product applications, are presented. Catalog No. 51 is available from the company.

LIGHT-WEIGHT PIPE. *Naylor Pipe Co., 1230 E. 92nd St., Chicago 19, Ill.* The utilization of Naylor pipe in mines is part of the contents of a new bulletin obtainable from the firm named above. The folder contains data and specifications on pipe from 4-30 in. diam.

ROASTING OF SULPHIDES. *The Dorr Co., Barry Place, Stamford, Conn.* Bulletin No. 7500 "FluoSolids Roasting of Sulphides" covers an economical means of producing SO_2 from pyrite or pyrrhotite to supplement short supplies of elemental sulphur.

STORAGE BATTERY DESULPHATION. *Gould-National Batteries, Inc., Trenton 7, N. J.* A two-page bulletin on how to return to full service motive power storage batteries which have lost capacity due to sulphation. Gives six causes of sulphation and details 11 steps to follow to restore batteries having various degrees of sulphation—from early development stages to the point where the battery must be scrapped. Copies can be had from the company.

Index to Advertisers

	Page
Allis-Chalmers Mfg. Co. General Machinery Division	3
Allis-Chalmers Mfg. Co. Tractor Division	Third Cover
Alloy Steel & Metals Co.	4
American Brake Shoe Co. American Manganese Steel Division	24
American Brattice Cloth Corp.	99
American Car & Foundry Co.	87
American Cyanamid Co. Explosives Department	78
American Potash & Chemical Corp.	101
Anaconda Wire & Cable Co.	21
Atlas Powder Co.	92
Baughman Mfg. Co.	110
Bemis Brother Bag Co.	94
Bethlehem Steel Co.	89
Bituminous Coal Institute	106
Bucyrus-Erie Co.	22
Card Iron Works Co., C. S.	90
Cardox Corp.	18-19
Chicago Pneumatic Tool Co.	95
Clarkson Mfg. Co., The	75
Crucible Steel Co. of America	10
Deister Concentrator Co., The	105
Dow Chemical Co.	111
Dunham Mfg. & Sales Co., Gordon S.	114
Du Pont de Nemours & Co., Inc., E. I.	82
Edison, Inc., Thomas A. Storage Battery Division	98
Euclid Road Machinery Co.	20
Flexible Steel Lacing Co.	101
Gardner-Denver Co.	84
Goddard-Jackson Co.	8
Goodman Mfg. Co.	13-15-17
Hardinge Co.	91
Harnischfeger Corp.	9
Hawthorne, Inc., Herb J.	107
Hendrick Mfg. Co.	88
Hewitt-Robins, Inc.	26-27
Hoffman Brothers Drilling Co.	120
Ingersoll-Rand Co.	2
International Harvester Co.	14
Jeffrey Mfg. Co.	80-81
Joy Mfg. Co.	28-29
Kennametal Inc.	67
Le Roi Co.	11
Link-Belt Co.	Second Cover & 104
Mack Trucks, Inc.	6
Macwhyte Company	104
Mancha Storage Battery Locomotive Division of Goodman Mfg. Co.	17
Mills Iron Works, Inc.	101
Mine & Smelter Supply Co., The	110
Mine Safety Appliances Co.	Back Cover
Mott Core Drilling Co.	120
Myers-Whaley Co.	1
National Mine Service Co.	23
Ohio Brass Co.	69-72
Okonite Co., The Hazard Insulated Wire Works	73
Osgood Co.	116
Paris Mfg. Co.	102
Pennsylvania Drilling Co.	120
Read, Davis	98
Republic Rubber Division Lee Tire & Rubber Co.	96
Roberts & Schaefer Co.	30
Rock Bit Sales & Service Co.	114
Salem Tool Co.	88
Santa Fe Tank & Tower Co.	109
Service Supply Corp. Manufacturing Division	103
Sheffield Steel Corp.	74
Smit & Co., Inc., Anton	113
Southwestern Engineering Co.	112
Sprague & Henwood, Inc.	16
Standard Oil Co. (Indiana)	7
Stephens-Adamson Mfg. Co.	66
Timkin Roller Bearing Co.	25
Ultra-Violet Products, Inc.	111
United States Rubber Co.	83
Universal Vibrating Screen Co.	120
Victaulic Co. of America	99
Vulcan Iron Works	12
Western Insulated Wire Co.	79
Western Machinery Co.	108
Western Rock Bit Mfg. Co.	115
Wild Surveying Instruments Supply Co. of America, Inc., Henry	117
Woomer & Associates, J. W.	98
Young, L. E.	98

Established 1902

HOFFMAN BROS. DRILLING CO.

CONTRACTORS

DIAMOND CORE DRILLING

PUNXSUTAWNEY, PA.

Our specialty—Testing bituminous coal lands
Satisfactory cores guaranteed

CORE DRILLING

ANYWHERE

"We look into the earth"

PENNSYLVANIA DRILLING COMPANY

PITTSBURGH 20, PA.

CORE DRILLING

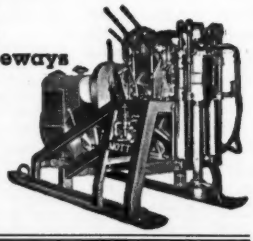
CONTRACTORS

Testing Coal Properties a Specialty
Guaranteeing Satisfactory Coal Cores

Pre-grouting mine shafts

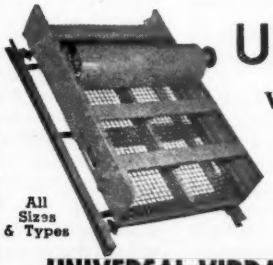
Large diameter holes for
Drainage, Air-shafts and Escapeways

Inside Mine Drilling



MOTT
CORE DRILLING CO.

Huntington, W. Va.



UNIVERSAL

VIBRATING SCREENS

For *CLEAN* and *MOST ECONOMICAL* SIZING

All Sizes & Types

Write today for Catalog No. 109 on Screens and Screening

UNIVERSAL VIBRATING SCREEN CO.

RACINE, WISCONSIN

Here's what WE mean by

EASY TO SERVICE

▶ Allis-Chalmers' new tractor line is blazing the way to simpler servicing with time and money savings never before possible.

▶ Adjustments are easier . . . lubrication simplified and lube periods greatly extended. Mechanics say these are the easiest tractors they have ever worked on!

▶ This all adds up to less down time, more producing time...longer tractor life at less upkeep cost.

▶ Following are just a few reasons why this NEWEST, FINEST TRACTOR LINE ON EARTH is *Easy To Service*...besides being built to "take it," easy to operate and entirely new in performance. Get the full story from your Allis-Chalmers dealer.

TIME-SAVING LUBRICATION DESIGN — Only a few lube points, easy to get at — NONE UNDER TRACTORS. You operate *75 HOURS* without any greasing — then only one fitting to hit and an oil change to make. (Only exception, torque converter bearings on HD-20). You lubricate the Positive-Seal truck wheels, support rollers and idlers only once every *1,000 HOURS!*

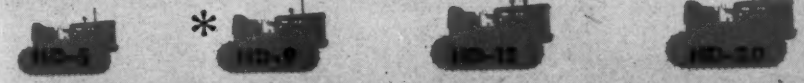
ACCESSIBLE ADJUSTMENTS — *QUICKLY MADE* — brakes, master clutch, steering clutches. No floor plates to remove for any adjustments. Tracks easier to adjust — simple screw adjustment with automatic lock.

EASY TO REPAIR — Engine, master clutch, transmission, steering clutches and final drives can be easily removed and repaired or replaced, *without disturbing adjacent assemblies.*

ALLIS-CHALMERS

TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

The Newest, Finest Tractor Line on Earth!



HD-5	HD-9	HD-11	HD-20
40.26 drawbar hp. 11,250 lb.	70 drawbar hp. 18,800 lb.	102 drawbar hp. 27,850 lb.	Hydraulic Torque Converter Drive 175 net engine hp.

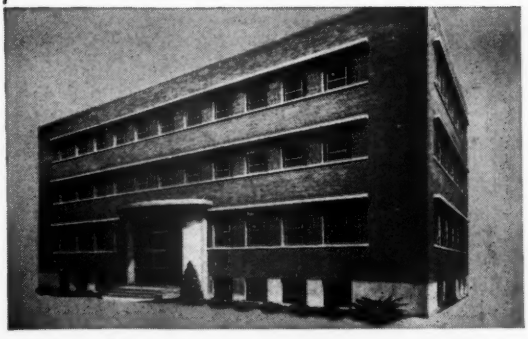
- DESIGNED FOR YOUR JOB
- BUILT TO "TAKE IT"
- EASY TO OPERATE
- EASY TO SERVICE

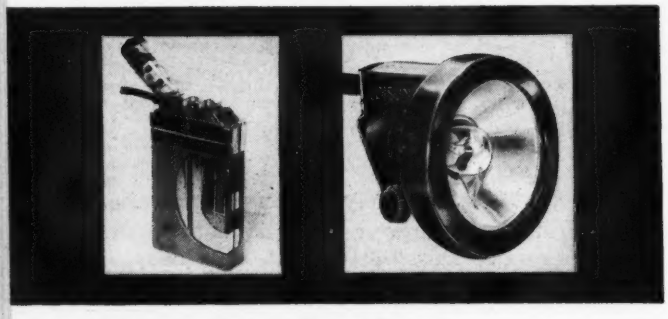
the EDISON R-4 ELECTRIC CAP LAMP

gives you MORE and BETTER LIGHT

Continuous Lighting Research

Behind the brilliant, unfailing beam of the R-4 lamp is the combined research achievements of the Edison and MSA Laboratories. Through the years, this team has successfully matched every step forward in mining methods with better and more dependable light. And today, the Edison R-4 is filling the greater illumination demands with an extra margin of performance to meet any expanding requirements of tomorrow.





Engineered for the Job

The exclusive nickel-iron-alkaline 4-cell batteries provide continuous, brilliant light output for the full shift. The rugged, fireproof, nylon case protects these batteries from damage in hard mine use. Headpiece allows use of spot or flood beam. Efficient gas-filled bulb has two filaments of equal intensity for reserve protection in case of burn-out.

Efficient Lamp Service

To see that you have effective lighting at all times, the MSA Service Man makes your lighting his business. He trains lamphouse attendants in the best maintenance methods. Between his periodical visits, he's ever available for emergency help when needed.

For the complete story on the Edison R-4 Electric Cap Lamp, write for Bulletin No. M-19, or let us arrange an actual demonstration in your particular mining operation at your convenience.

MSA
SAFETY EQUIPMENT HEADQUARTERS

When you have a safety problem, M.S.A. is at your service. Our job is to help you.

MINE SAFETY APPLIANCES COMPANY

Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

At your Service: 49 Branch Offices in the United States and Mexico

MINE SAFETY APPLIANCES CO. OF CANADA LIMITED

Toronto, Montreal, Calgary, Winnipeg, Vancouver, New Glasgow, N.S.

Cable Address: "Minsaf" Pittsburgh